Mekelle University

The School of Graduate Studies

Faculty of DryLand Agriculture and Natural Resources

The Non-income Dimensions and Determinants of Poverty of Members of Cooperatives in Central Zone of Tigray, Ethiopia

By

Mulu Alene

A Thesis

Submitted in Partial Fulfillment of the Requirements for The

Master of Science Degree

in

Cooperative Marketing

Advisor

Kelemework Taffere (Ph.D)

April, 2008

Declaration

This is to certify that this thesis entitled "The Non-income Dimensions and Determinants of Poverty of Members of Cooperatives in Central Zone of Tigray, Ethiopia" submitted in partial fulfillment of the requirements for the award of the degree of M.Sc., in Cooperative Marketing to the School of Graduate Studies, Mekelle University, through the Department of Cooperatives, done by Mr. Mulu Alene Zeleke, Id. No. FDA/PR0020/99 is an authentic work carried out by him under my guidance. The matter embodied in this project work has not been submitted earlier for award of any degree or diploma to the best of my knowledge and belief.

Mulu Alene Zeleke	_____	_____
Name of the student	Signature	Date
Dr. Kelemework Taffere	_____	_____
Name of the supervisor	Signature	Date

TABLE OF CONTENTS

The Non-income Dimensions and Determinants of Poverty of Members of Cooperatives in Central Zone of Tigray, Ethiopia

By
Mulu Alene (B.Sc.), Addis Ababa University
Advisor
Kelemework Taffere (PhD), Mekelle University

Abstract

Poverty has been and remains today a contested area. There is unanimous agreement that it is a problem and that action is needed to address it. However, there is a disagreement over what constitutes poverty, the unit of focus (individuals or households) and the importance to be given to different dimensions of poverty. Disagreement about what constitutes poverty is in turn closely linked to disagreement about its causes and the weight to be given to these different causes. This, in turn, leads to disagreement about how best to address it.

Likewise, in an attempt to fill the research gap observed in Ethiopia with the capability perspective, the present study was carried out at Central Zone of Tigray National Regional State with specific objectives of exploring the non-income dimensions and determinants of poverty of members of cooperatives in the rural areas. In order to attain this aim the study made use of the primary data collected by conducting formal household survey from representative sample respondents through personal interview using structured schedule. A two stage cluster sampling design was followed to select the primary sampling units (PSU). In the first stage, the list of all multi-purpose primary cooperatives from each selected woreda was used to identify that cooperative to be included in the survey using systematic random sampling method. Subsequently, the list of all multi-purpose primary cooperative members from each Tabia cooperative

promotion office was used as a frame to select the sample households of members of cooperative in the rural areas of central zone of Tigray.

The data collected from the survey on annual expenditure of households on consumption and non-consumption items were analyzed and comparing the non-food expenditure component calculated from the data available against the results of non-food expenditure component deflated to 2008 for rural Tigray, 47 sample households (27%) were poor and 127 sample households (73%) were found to be non-poor.

The result of the logistic regression model revealed that among the 18 variables considered in the model, 9 explanatory variables are found to be significant up to less than 10% probability level. Accordingly, getting services from cooperatives (significant at less than 1%), dependency ratio, number of livestock owned, health status of household members, number of household assets owned by the household and body mass index of household members greater than or equal to 18.5 (significant at less than 5% level), and family size, ability of the household head to read and write and copping mechanism of the household in times of emergency (significant at less then 10%) were found out to have strong negative correlation with the households non-income poverty status.

DEDICATION

I dedicate this thesis manuscript to ROMAN GEBRESSELASIE Head of Tigray Region Women's Affairs Bureau for her leadership capabilities towards the success of poor women, and my children ABEL MULU, MISMAK MULU and MILKANA MULU for their affection and love.

Acknowledgement

God brings a solution from the right side while an obstacle comes from the left side. I am indebted to the Almighty God with whose grace; I could satisfactorily complete my graduate study.

No words can suffice to express my feelings of gratitude to Mekelle University Management Bodies who gave the opportunity of attending the post graduate studies covering the tuition fee for employees in Governmental Organizations (GOs) in Tigray region. It is my pleasure to extend my thanks to the members of the department of cooperatives particularly to Prof. G.B. Pillai and Dr. G. Veerakumaran for their good understanding and smooth relationships with their students which I didn't ever face in my undergraduate study. Special thanks go to my dearest sister Tikdem Alene for her financial and moral support. I am very much indebted to my friend Maru Jibriel who proved the saying "a friend in need is a friend indeed" repeatedly through his generous assistance and helpful encouragement before and during my graduate study

Furthermore, my special thanks go to W/t Ayehualem Wendimu and Tewodros Abate for their concern and kindness in providing me valuable reference materials. I would like to express my heartfelt thanks and sincere appreciation to Ato Senay Tekle, Ato Amare Gebrewahid, Ato Micheale Anenya, Ato Yibrah Girmay, Tewabech Abera, Martha Abraha and other unmentioned friends for their unforgettable continuous encouragement and carrying out the hectic duty of data collection process and analysis in time. I am deeply grateful and indebted to Dr. Kelemework Taffere, my advisor, for his encouragement, suggestions and guidance without whose assistance successful accomplishment of this research would have been very difficult.

BIOGRAPHY

The author was born in Adwa town of Central Zone of Tigray National Regional State in May 1967. He attended his primary education in Adwa Bete-kihnet Elementary School and Secondary education at Queen Sheba Comprehensive Secondary School and completed his secondary education in 1986. Then, he joined the then Addis Ababa University (AAU) in 1986/87 and graduated with B.Sc. degree in Statistics in 1990.

Soon after his graduation, he was employed in the then Central Statistical Agency and served in the Agency for 14 years at various levels as assistant researcher, regional cartographic officer in Tigray, trainer on different surveys launched by the agency and head of Tigray Region Statistical Office. Then after leaving the Central Statistical Agency he joined the Environmental Protection, Land Administration and Use Authority (EPLAaUA) in Tigray in 2004/5 where he served as head of Project formulation, Planning and Training department until he joined the School of Graduate Studies at Mekelle University (MU) in 2006/7 academic year.

ACRONYMS

AAU	Addis Ababa University
AIDS	Acquired Immune Deficiency Syndrome
ARDB	Agriculture and Rural Development Bureau
BCG	Tuberculosis
BMI	Body Mass Index
BoFED	Bureau of Finance and Economic Development
CSA	Central Statistical Agency
DGH	Democracy, Good governance and Human rights
DHS	Demographic and Health Survey
DPT	Diphtheria
DW	Motorized Pump Wells
EPLAaUA	Environmental Protection, Land Administration and Use Authority
FAO	United Nations Food and Agricultural Organization
FHH	Female Headed Households
GER	Gross Enrollment Ratio
GOs	Governmental Organizations
HH	House Hold
HICE	Household Income Consumption and Expenditure
HIV	Human Immune Deficiency Virus
HW	Hand Dug Wells
Kg	Kilogram
Kms	Kilometers
MDG	Millennium Development Goals

MoFED	Ministry of Finance and Economic Development
MU	Mekelle University
NCHS/CDS	National Centre for Health Statistics and US Centre for Disease Control
NET	Net Enrollment Ratio
NGO	Non Governmental Organization
OLS	Ordinary Least Square
ORS	Oral Re-hydration Solution
PNC	Prenatal Care
PRSP	Poverty Reduction Strategic Paper
PSU	Primary Sampling Unit
SDR	School Dropout Rates
SNNP	Southern Nations, Nationalities and Peoples
SPSS	Statistical Package for Social Sciences
SRS	Systematic Random Sampling
SSA	Sub-Saharan Africans
SSU	Second Stage sampling Unit
Std. Dev	Standard Deviation
SW	Shallow Wells
TBA	Untrained Traditional Birth Attendant
TTBA	Trained Traditional Birth Attendant
UNICEF	United Nations International Children's Emergency Fund
US	United States
VIF	Variance Inflation Factor
WM	Welfare Monitoring

List of Tables

List of Figures

List of Tables in the Appendix

Chapter I: Introduction

1.1 Background

On average, 45 to 50 percent of Sub-Saharan Africans (SSA) live below the poverty line (on less than a dollar (US) a day) … a much higher proportion than in any region in the world except South Asia. At least 50 percent of these people are from five East African countries. (World Bank, Poverty in Sub-Saharan Africa Issues and Recommendations). Beyond low income, a principal indicator of poverty is inadequate access to social services. Currently, the availability of social services in most SSA countries is the lowest in the world. The average gross primary school enrollment rate, which declines as the grade level increases, is currently only 67 percent. Health services are falling behind demand in most countries in SSA. This is reflected in an average infant mortality rate of 93 per 1,000 live births.

Over the last five years, there is a slight improvement in the level and distribution of poverty in Ethiopia. At country level the total calorie intake per individual per day is 2,353 as obtained from the household income, consumption and expenditure survey (HICEs) result of 2004/5 conducted by the central statistical agency. Results obtained from the same survey conducted in 1999/2000 show 2,211.2 calorie in take per day per person. Comparing the results against 1999/2000 survey year, at country level an increment in daily calorie intake was observed.

In terms of non-income dimensions of poverty, Ethiopia has made a remarkable progress between the 1999/00 and 2004/5 surveys. There has been a substantial improvement in long-run (stunting) malnutrition and literacy. Although there is still a challenge to narrow gender gaps as well as maintaining quality, gross and net primary and secondary enrollment have also shown substantial improvement. Access to public services and economic infrastructure has, on average, improved between the two survey years (1999/00 to 2004/5). For instance, at country level most of the households (74.5 percent) can access primary schools with in a distance of less than 5 kilometers (CSA, WM survey, 2004/5). In Ethiopia, 50 percent of the households are found at a distance of less than one kilometer to have access of drinking water during dry season. This result was only

35.9 percent before half a decade. The same is true for secondary school, health centre, etc which obviously plays an important role in poverty reduction.

On the other hand, the standard of living of the population is still in its lowest stage as compared to even some Sub-Sahara African countries. The average life expectancy at birth was 50.4 years in 1994 which declined to 42 years in 2001. There is no significant difference between the 1999/2000 and 2004/5 HICE survey results on the annual average domestic expenditure per person which was found to be Birr 1,222.45 and 1,697.35 respectively (CSA, HICE survey, 2004/5) the largest expenditure grouping being food. Housing, water and fuel account the second largest component of expenditure with 18.1 percent which are mostly imputed values when obtained freely. The proportion of people in Ethiopia who are absolutely poor (unable to meet their basic needs) during the year 1999/00 was 44.2 percent. The proportions of people who are absolutely poor are 37 percent in urban areas and 45 percent in rural areas indicating that the rural poverty is higher than urban poverty by 23 percent (Source: Ministry of Finance and Economic Development, MoFED, March 2002, Development and Poverty Profile of Ethiopia). The dependency ratio for the country is 102 which imply every 100 persons in the productive age have to support themselves and additional 102 dependents. This result is 110 for rural and 65 for urban. The dependency ratio for Tigray is 100. This indicates the vast extent of poverty prevailing in the rural areas of the country (Source: C.S.A., HICE survey, 2004/5).

As a result, Ethiopia has put poverty reduction strategies high on the agenda and working firmly on the implementation program since the beginning of this decade. With firm dedication to reduce poverty, the government has prepared its poverty reduction program entitled “Sustainable Development and Poverty Reduction Program” in 2002. The strategy has been implemented over the past 5 years.

In light of the plan to reduce poverty over time, cooperatives have been and are still playing vital role in increasing the livelihood of their members in particular and of the society at large. This has been proven by the field visit conducted by the second batch of post graduate students of cooperatives department in Mekelle University in the regions of Tigray, Oromia, Southern Nations, Nationalities and peoples (SNNP) and Addis Ababa to primary cooperatives & unions in 2007. However, to

- Assess the poverty scenario in the cooperative members.
- Indicate the impact of co-operative membership on the level of household welfare.

- Establish follow-up procedures and activities directed towards poverty reduction through cooperatives.
- Assess the efficiency of cooperatives in poverty reduction

Conducting survey targeting members of cooperatives becomes important to produce, analyze and disseminate poverty related data and results.

1.2 Statement of the problem

Over the last three decades, widespread poverty has prevailed in many Sub-Saharan African countries of which Ethiopia is the most affected one. On the one hand, over the last 50 years the international financial institutions led by the World Bank have been prescribing different approaches and strategies for tackling poverty in developing countries. However, although some success stories of economic reforms and growth in different countries have been reported, poverty remains pervasive and continues to plague millions of people in most African countries, owing to unequal access to resources and institutional constraints (World Bank, 2000a). The same source states that Africa enters the 21st century comprising some of the poorest countries in the world. About 290 million people, who constitute about 46 percent of the total population of the region, live on less than a $1 (one US dollar) per day per adult. Average per capita income is even lower than the 1960s. Incomes, assets, and access to essential services are unequally distributed. The most vulnerable to poverty live in rural areas. A significant proportion of the population does not have access to safe water and has limited or no access to social services, such as education (World Bank, 2001).

According to FAO (1997 & 2001), in most developing countries, urban poverty is a consequence, at least partly, of rural poverty. In rural areas, livelihood insecurity pushes population towards urban centers in expectation of a better life. Accordingly, in the context of rural-urban migration, addressing rural poverty actually presents a formidable opportunity for preventing urban poverty (FAO, 2001).

Ethiopia's poverty for the last nearly four decades, more specifically of its chronic food shortage has made the country to depend on external food assistance. The recent circumstances during 1999/00 were also unfavorable. First, sporadic drought incidences were recorded in regions like Tigray. Second, two years of consecutive drought which had affected agricultural output particularly crop production followed. Third, the Ethio-Eritrean border conflict reached its climax

in 1999/00. Finally, Ethiopia experienced severe shocks in its terms of trade because of the collapse in the international coffee prices. Despite all these problems, poverty has declined modestly in rural areas by 4.4 percent. With respect to food security, rural areas are still the center of mass poverty, requiring continued priority action.

On the other hand, Ethiopia has made a remarkable progress in terms of indicators of non-income dimensions of poverty since 1995/6. There has been a substantial improvement in long-run (stunting) malnutrition and literacy. Access to human capital has also improved. Access to public services and economic structure has, on average, improved between 1995/6 and 1999/00. For instance, average distance to reach primary school, which stood at 3.8 kilometer, has declined to 3 kilometer by 1999/00. The improvement in enrollment rate is higher for rural areas and females than for urban areas and their male counterparts. The same is true for secondary school, health center, drinking water, etc. This obviously plays an important role in poverty reduction. Sale of animals, animal products and agricultural products are the most important risk coping instruments in rural areas.

It should be noted that poverty reduction is a long-term process of sustained growth and is not amenable to significant improvements in a short period of time. The study of poverty is a continuous process and one has still to monitor changes over time to assess whether there is a positive direction and gains in poverty reduction.

The study area, namely Central zone of Tigray, is not different from other parts of the country with respect to the situations of poverty. The area is dominated by mixed-agriculture mode of life that involves a hoe-culture affair for cultivation, land degradation, marginalization, limited infrastructure and social services.

All the aforementioned poverty situations and constraints are the true highlights of rural Ethiopia, but the people in the rural areas are believed to gain the non-income dimensions as well as magnitudes of poverty are not evaluated using the available methods of measurement and the problems pertaining to it are not addressed, yet.

The main objective of the introduction of the cooperative movement is to help the economically weaker sections of the society grow stronger through collectively pooling together their limited resources. Cooperatives are expected to improve the living standards of their members and

producing information on whether the living standard of members of cooperatives is increasing or not is desirable.

There are so many ways of collecting information, one of which, being conducting surveys. Hence, information collected directly from members is reliable. Therefore, the level of non-income poverty in cooperative members was collected from 10 primary cooperative societies found in rural central zone of Tigray.

1.3 Significance of the study

Researches regarding the extent of poverty in the country have been launched by different institutions. However this part, the level and extent of poverty in the co-operative societies specifically, has yet to be assessed. Because having clear picture and information on the capability status of cooperative member households in the survey areas can provide a basis for a detailed analysis on non-income poverty status of members of cooperatives in the country. Therefore, this research's objective is to measure the non-income dimension of poverty in members of cooperatives and to provide information on the living standard of members of co-operatives for policy makers and other researchers.

1.4 Objectives of the Study

General Objective: The general objective of the study is to assess the non-income aspects of poverty among the members of cooperatives in the Central zone of Tigray.

Specific Objectives:

- To assess the contribution of the non-income dimensions of poverty to members of cooperatives.
- To analyze the determining factors of poverty in cooperative member households.
- To evaluate the impact of cooperatives movement on household's living standard.

1.5 Hypothesis

Poverty and poverty changes are affected by multi-dimensional variables at macro and micro-economic levels. This is briefly explained in the analysis part. In the context of non-income dimension of poverty the general hypothesis is explained as follows.

- There is no significant correlation between household's poverty status and non-income dimension of poverty.

1.6 Scope and Limitations of the study

This survey was conducted to identify the level of non-income poverty in members of cooperatives at household level and to assess their standard of living at micro-level in the central zone of Tigray. The basic indicators on households' living standards with respect to basic needs include education, health, child nutrition, access to & utilization of basic facilities, housing and housing amenities (drinking water, sanitation, energy, etc) household assets, selected indicators of living standard, vulnerability (shocks and coping mechanisms, food Security, etc) and basic population characteristics.

The survey has dealt with a limited number of households and focused on the non-income dimension of poverty at household level but did not include intra-household dimension. Data on Gross and Net Enrollment, School Dropout, Repetition Rates, Facilities and Amenities, Malnutrition status of Children, BMI for Adults, data on DGH, etcetera…are collected and analyzed.

Counts in the tables vary according to the type of questions pertaining to the head of the household individual members of households while small differences in the totals of certain tables is attributable to missing values during the data collection process.

Apart from highlighting some advantages of extending poverty to non-income dimensions, it is also important to mention some of the problems. Probably the most important drawback is that it would not yield new (or dynamic) useful information, as many non-income dimensions of wellbeing do not change much over time. Moreover, change in some non-income measures generally means improvement, at least in the way it is measured. The most extreme example of this would be to use the years of schooling to track education poverty of adults. This indicator is likely to stay the same for the vast majority of adults once they leave the educational system and if it changes, it will only go up, but never down (as surveys usually track only educational improvements, but not the loss of knowledge/ skills over time). But the suggestion in these non-income measures is that many people in many developing countries are deprived of critical functioning (Isabel Gunther and Stephan Klase, May 2007) and these non-income measures adequately reflect the functioning shortfall in question. For example, adults (many of whom are

female) in developing countries who never had the opportunity to be schooled will be educational poor. This might be an obvious statement, but from a wellbeing perspective we occasionally need to be reminded that attempts to achieve universal enrolment for children will do nothing to combat education poverty among adults.

The second drawback is that in measuring non-income poverty, several new conceptual questions arise. For example, what is education and health poverty among children? How does one define such poverty? Is an individual education poor only if he/she is not in school? Or is the individual also education poor if he/she is lagging behind in progressing through school? Or what if his performance is deteriorating? Similarly, is stunting already an indicator of poverty since it is related to lower-than-required energy intake (UNICEF, 1998). Clearly these are serious questions but here, too, there is need for more work in extending the concept of poverty to these issues rather than abandon the effort.

Thus, it is believed that studying the non-income dimensions of poverty is well warranted, and the approach taken here is to simply explore whether, given the data and measurement constraints, reasonable ways to conceptualize and measure non-income poverty can be extended and generate useful additional information on the level and extent of non-income poverty in households of members of cooperatives.

1.7 Organization of the Study

The thesis is organized into five chapters. Chapter one deals with the introductory part. Chapter two deals with review of literature that includes theoretical frameworks of non-income poverty and empirical studies made in the country. Chapter three presents a brief description of the survey area and methodology employed in data collection and analysis. Results obtained are discussed in chapter 4 and finally chapter 5 presents the summary, conclusion and recommendation of the study.

Chapter II: Literature Review

2.1 Concepts and Definitions

2.1.1 The Concept of poverty

The existing literature on the subject (Mikrie, 2005), poverty is said to exist in a given society when one or more persons do not attain a level of material wellbeing deemed to constitute a reasonable minimum by a standard of that society. As a result, according to Mikrie's Citation, the starting point in any poverty study is the question of how one measures or assesses wellbeing and based on that at what level of measured wellbeing one classify that a person is poor or non-poor. Similar to the income dimension, we define 'poverty lines' for the non-income dimensions based on a reasonable (but essentially arbitrary) notion of who should be considered as poor in the relevant dimension (Isabel Gunther and Stephan Klase, May 2007). The question arises as to which non-income indicators should be analyzed. For a theoretical discussion of temporary and long-term wellbeing, an analysis of a very broad range of functioning might be appropriate, but it could be more useful to focus on a smaller subset of basic functioning for empirical studies. We therefore, have focused on minimum capabilities of households of members of cooperatives on education, health, nutrition, housing conditions & amenities, access to basic facilities and vulnerability to shocks. Also, in line with the literature on income poverty, we treated poverty in the income and non-income dimensions as a dichotomous yes/no question and has not considered its depth or severity.

The measurement of poverty is classified into two parts. The first is the income dimension of poverty which requires data on income, consumption and expenditure pattern of households for its measurement. There are three methods to determine the poverty line: direct calorie intake, food energy intake and cost of basic needs methods. In the case of direct calorie intake method, poverty is defined as the minimum calorie requirement for survival. Individuals who consume below a predetermined minimum level of calorie intake are deemed to be under poverty. Hence, this method equates poverty with malnutrition and does not consider the non-food requirement. The food energy intake method of setting poverty line is defined as the level of per capita consumption at which people are expected to meet their predetermined minimum calorie

requirement. This method is an improvement over the direct calorie intake in terms of representative ness of the poverty line as it now provides the monetary value rather than purely nutritional concept of poverty. This method does not yield a consistent poverty line across groups, regions and periods. The cost of a basic need method in setting a poverty line is defined by selecting a 'basket' of food items typically consumed by the poor. The quantity of the basket is determined in such a way that the given bundle meets the predetermined level of minimum caloric requirement. This 'basket' is valued at local prices or at national prices if the objective is to arrive at a consistent poverty line across regions and groups. To account for the non-food, the poverty line is divided by the food share of the two poorest quartiles or quintiles as the case may be. This method yields a representative poverty line in the sense that it provides a monetary value of a poverty line that accounts for food and non-food components. Unlike the food energy intake method, this provides consistent poverty lines across regions and a specific allowance for the non-food component consistent with the spending patterns of the poor is added to the food poverty line. Therefore, the cost of a basic need method is employed in determining the poverty line in income /consumption/ method of research work to differentiate the poor from the non-poor. According to literatures, the poverty line used in Ethiopia is Birr 1,075.00 while in rural Tigray it was found to be Birr 1,176.066 with food expenditure Birr 753.054 and non-food expenditure accounting Birr 423.012 which was estimated by 1995/96 HICE & WM survey based on a basket providing 2,200 kcal per adult equivalent per day.

The second is the non-income dimension of poverty that require data on basic needs including education, health, child nutrition, access to basic facilities, housing amenities, vulnerability, etc. for its measurement. This concept of poverty measuring indicators was adhered to in this paper.

Therefore, the objective is to assess the level, extent and distribution of the non-income poverty in members of cooperatives.

2.1.2 Definition of terms

Cooperative: - A Cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise.

Cooperative society: - means a society established by individuals on voluntary basis to collectively solve their economic and social problems and to democratically manage same.

Member: - means any physical person, or society established under Proclamation No. 147/98 with Amendment No. 402/2004 and 106/2004, which is registered after fulfilling his membership obligations.

The following CSA's standard definitions of terms are adhered to throughout the research work;

Household: - consists of a person or group of persons irrespective of whether related or not who normally live together in the same housing unit or group of housing units and who have common cooking arrangements.

Head of household: - A head of household is a person who economically supports or manages the household or for reasons of age or respect is considered as "head of household" by members of the household or declares himself as head of a household.

Please Note: - Head of a household could be male or female.

Member of a household: - Person constituting a household is called member of the household.

The following are considered as members of a household

i) All persons who lived and ate with the household for at least six months including those who were not within the household at the time of survey and who are expected to be absent from the household for less than six months.
ii) All guests and visitors who ate and stayed with the household for six months and above.
iii) Housemaids, guards, baby-sitters, etc who lived and ate with the household even for less than six months.

Household size: - Is the total number of members of a household.

School dropout: - A person is considered to be a school dropout if he/she did not appear for the end of year examination or took the examination but did not register the following academic year.

Gross enrolment ratio: - The gross enrollment ratio for primary level is defined as the total number of pupils attending in grades 1-8 during the current school year divided by the total number of children of primary school age (7-14 years).

Net enrolment ratio:- Net enrollment ratio is defined as the number of pupils of primary school age (7 years) and is currently attending primary school divided by the total number of children in that age (7 years).

Facilities and Amenities: - These are basic infrastructures such as food markets, postal, telephone, school, health, drinking water and transport services, etc.

Anthropometry: - The technique that deals with the measurement of the size, weight and proportions of human body.

Nutrition poverty: is defined as being below a Body Mass Index (BMI) of 18.5. The BMI is defined as the weight in kg divided by the height squared in meters of individuals.

Dependency ratio: - is defined as household members older than 65 and younger than 15 divided by the complement of this set in sampled households.

Headcount Index: - is defined as the proportion of population whose measured standard of living is less than the poverty line.

Calorie: - is the energy required to heat one gram of water by one degree Celsius.

2.2 Conceptual Perspectives of Measuring Poverty

There are two dimensions of poverty

- The income dimension of poverty.
- The non-income dimension of poverty

It is obvious that it would be useful to study poverty in non-income dimensions as it would enable us to track wellbeing *outcomes* rather than simply track important wellbeing *input* (income) overtime. Thus it would allow us to measure wellbeing itself rather than its proxy only.

Analyzing non-income poverty, first of all, allow an assessment of the relationship between income and non-income poverty. Identifying households under poverty from non-income approach could possibly be most deprived and arguably the most deserving of support. Conversely, in identifying the non-poor, we would learn more about the relationship between income and non-income poverty. This has direct relevance for policy purposes as policy makers are interested in reducing poverty in both income and non-income dimensions. Thus it is vital to recognize the relationship between the two, e.g. whether the improvements in income will eventually improve health outcomes or vice versa.

2.2.1 The Non-income Dimension of Measuring Poverty

The socio-economic data that reflect the non-income dimension of poverty will use basic indicators on the various socio-economic areas, which include health, education, shocks and

coping mechanisms, access to and utilization of basic facilities /services/ and related non-income aspects of poverty that members of cooperatives attained.

There is practical advantage to focusing on the measurement of non-income poverty, as many indicators of non-income deprivation (e.g. education or housing) are easier to measure and less prone to measurement error than income (or consumption) measures. In fact, at times it may be useful to use non-income measures of wellbeing as instruments to correct poorly measured incomes (and/or consumption).

Another measurement advantage is that information on past non-income wellbeing is often not only easier to obtain but also more reliable than information on past income series. For example, it is easier to get reliable information on an individual's educational history than his income history. Moreover, certain current non-income indicators can already provide information on historical trends in access to critical functionings. For example, the current grade of a child at a certain age reveals important aspects of his past educational history.

The emphasis on *income/consumption* in the assessment of poverty has clear limitations and shortcomings (Hulme and Mckay, 2005), as it is well-recognized that income (consumption) is an inadequate indicator of wellbeing. If we conceptualize wellbeing from a capability perspective, income is but one means (and for some capabilities a rather poor one at that) for generating such capabilities as the ability to be healthy, well-educated, integrated, clothed, housed, and the like (Sen1985, 1999; Klasen 2000). Nor do equal incomes translate into equal capabilities for different individuals, due to the heterogeneity of people in translating income into wellbeing. It is therefore preferable to study wellbeing *outcomes* directly (e.g. capabilities, Klasen 2000) to understand the choices people have at their disposal rather than study a specific wellbeing *input.*

The purpose of this survey is, therefore, to conceptualize poverty from a non-income perspective and then measure the level of poverty in members of cooperative households in the central zone of Tigray.

2.2.2 The Income Dimension of Measuring Poverty

According to CSA's HICE Survey report (1999/2000), the income dimension of measuring poverty which is collected based on Household Income, Consumption and Expenditure (HICE) to arrive at the ultimate household income, is a complicated measuring technique.

This survey requires three basic schedules for data collection,

1. Schedule on household consumption expenditure that is, consumption of food, drinks and tobacco;
2. Schedule on household expenditure on various consumption and non-consumption items such as, expenditure on clothing and foot wear, household goods and services, house rent, energy and water, transport and communication, entertainment and education, personal care and household non-consumption expenditure items.
3. Furthermore, information on household income and receipts is collected for the income dimension of measuring poverty.

This type of data collection takes into account the two major seasons of the country, i.e. the slack season (June) and the peak (harvest) season, January. The interview method and objective measurement of household consumption items are utilized for data collection in this survey. The field work for this type of survey requires two months per round totaling 4 months to accomplish data collection only in the survey period. Households are interviewed twice a week and for eight times during the one month period in each round. It is believed, as CSA points out, that the relatively frequent visit made by the enumerator to each household is essential to control the errors arising from memory lapse which is common in household survey of this nature.

2.3 Indicators of Poverty

- **Education related indicators**

According to the report of Tigray region education bureau, gross enrollment ratio for the grades 1-8 has reached 104 percent in 2006/7. However, this percentage declines drastically to 45 and 10 for the grades 9-10 and 11-12 respectively in the same year. The net intake rate from the same source shows 76.38, 88.75 and 90.51 percent for the years 2004/5, 2005/6 and 2006/7 for the grades 1-8, respectively. The dropout rate for the grades 1-4 in Tigray was 4.15 for males and 3.13 for females in the year 2006/7. Repetition rate for both sexes has declined for the years 2004/5, 2005/6 and 2006/7 in primary school. However, the gap in repetition rate for females increases as the grade level increases.

- **Health and related indicators**

There have been no improvements over the past five years in the percentage of mothers who receive antenatal care from health professional in Tigray which was only 36.4 percent in 2000 and 35.3 in 2006. The percentage of antenatal care in Tigray is higher than the national percentage (27.6 percent) of women who had antenatal care from health professional. By comparing the percentages in 2000 and 2005, no improvement was observed in vaccination coverage in Tigray over the past five years but absolutely greater than the national vaccination coverage in all vaccination types. For example, percentage of fully immunized in 2005 was 58.4 in Tigray while 36.9 at national level. Prevalence of diarrhea in Tigray has declined from 17.2 percent in 2000 to 12.8 in 2005. At national level prevalence of diarrhea has declined from 23.6 percent to 18.0 percent. Percentage of children under five with diarrhea taken to health provider is 18.8 and 22.2 in 2005 at regional and at national level respectively. Prevalence of fever in 2000 was 20.3 percent and 18.7 percent in Tigray and at national level respectively. There is a notable decline in the prevalence of fever from 36.6 percent to 20.3 percent over the past five years in Tigray. Knowledge about ORS packets by mothers is 80.8 percent in 2005 (CSA, Demographic and Health Survey, 2005).

- **Nutritional status and child care**

The Demographic and Health Survey results show that there have been some improvements in the nutritional status of children over the past five years. The percentage of children stunted fell by 14 percent from 55 percent in 2000 to 41 percent in 2005. Similarly, the percentage of children under-weight declined by 6 percent from 47.9 in 2000 to 41.9 percent in 2006. There was, however, no change over the past five years period in the percentage children wasted. The surveys conducted by CSA do not collect information on nutritional status of adults. This study has identified this gap and data on weight and height was collected to have information on the Body Mass Index (BMI) of adults.

- **Indicators on access to selected basic facilities**

An important measure of access to public services is the distance between the residence of households and the facility at hand. The average distance to elementary schools for the country as

a whole was three kilometers in 1999/00. The mean distance to secondary schools during the same period was 23.7 km for the country as a whole and 26.9 km for rural areas.

By 1999/00, for the rural areas of the country, the average distance households has to travel in order to obtain water more than 400 meters in the rainy season and 850 meters in the dry season. A quarter of the total population fetches water from sources that are at least one kilometer away from their residence.

For the country as a whole, average distance for households to reach food markets was 5.19 km in 1999/00 and rural households have to travel 5.88 km on average to reach a food market. Postal services are, on the average, more than 20 km away from rural households.

Coverage of access to potable water is 50 and 41 percent in urban and rural Tigray in 2005, respectively. Distance of access to potable water in rural Tigray is with in 1.5 kms.

- **Indicators on Housing, Status of housing facilities and tenure**

According to the analysis made from the 1999/00 HICE and WM surveys, about 85 percent of the households in Ethiopia are living in low quality houses made of wood & mud and 65 percent of the houses are grass-roofed houses. Only about 15 percent of the houses in the rural areas of Ethiopia have corrugated iron sheets. For the country as a whole, only 17 percent of the households use latrine and 81.7 percent use open field for toilet indicating poor sanitation.

- **Possession of household assets**

The main means of livelihood in rural Ethiopia is agriculture. Thus, land ownership in rural areas becomes an important determinant of poverty. Although, the WM survey of 1999/00 has not informed on the amount of land owned by households, almost all households in the rural areas of the country own some amount of land. Rural households on average own 4.1 cattle per household at country level and important input in agriculture production in Ethiopia is the availability of traction power. This is mainly done with the use of oxen. Thus, this study has collected data on households owning oxen.

- **Living standard Indicators like mortality rates, etc.**

Infant mortality rate has declined from 112.9 to 80 at national level and from 103.6 to 67 at regional level per 1,000 live births. In Tigray under-five mortality has declined from 169 to 106 deaths per 1,000 live births in the past five years (CSA, Demographic and Health Survey, 2000 & 2005).

- **HIV/AIDS knowledge**

There is a marked increase in the use of injectables over the past five years in Tigray (from 6.5 percent in 2000 to 13.1 percent in 2005) but a decline in condom use (from 0.7 in 2000 to 0.1 percent in 2005). The percentage of not currently using contraception is 83.5 and 85.3 in 2005 at regional and national level, respectively (CSA, DHS, 2000 & 2005).

- **Large number of dependants**

Based on responses of households to the HICE and WM surveys, the average family size for Ethiopia stood at 4.9 persons per household with poorer households having larger families (5.8 individuals per household in the first quintile to 3.9 per household in the 5th quintile). Such a difference in family size itself reflects the variation in the average dependency ratio. Poorer households tend to have larger proportion of dependants: 134 per hundred for the first quintile and 89 per 100 for the fifth quintile. Members of poorer household tend to have older household heads compared to richer ones.

- **Vulnerable to contingencies**

Rural households are endowed with assets such as land and livestock and the major ex post risk coping mechanism is the sale of animal products and other agricultural outputs. The results of 1999/00 HICE survey showed that the role of modern banks as well as traditional sources of finance such as 'Idir' and 'Iqub' has been found to be very much limited in the provision of security for rural households in the country.

- **Indicators on measuring democracy, good governance and human rights (DGH) in the context of fighting poverty**

US Aid Handbook of Democracy and Governance program indicators was employed to collect information on whether there are schools offering civic education, members of cooperatives with civic knowledge, members of cooperatives participating in political activities, members of cooperatives with access to the legal system and cases dropped due to inability to afford.

2.4 Cooperatives and Poverty Reduction

Role of cooperatives towards achieving the Millennium Development Goals (MDGs) of productive employment, eradication of poverty, social integration and advancement of women is vital. Cooperatives are at work in almost every country and economic sector. More than 760

million people around the world are engaged in the cooperative movement (www.un.org/esa/socdev/poverty/subpages/coop_panel.htm). And about 5 percent of the total populations of Ethiopia are members of cooperatives.

Whether a rural cooperative engaged in providing agricultural inputs to its members or savings and credit co-operative providing credit to its members, a co-operative can play a significant role in fulfilling development objectives.

It is generally recognized that cooperatives respond effectively to the ever-changing needs of people. For example, in response to the effects of soaring food prices, people continue to choose consumer cooperatives to address their needs. In a number of countries, people are starting new cooperative enterprises in areas as social care.

Women and youth are also choosing the cooperative form to start enterprises of their own, thus creating new jobs and opportunities. The cooperative advantage extends to the users of cooperatives and indeed to the communities in which they operate. In some countries, cooperatives are seen as leaders in promoting food safety and security, and in protecting the environment. Still in others, cooperatives are building peaceful societies by promoting understanding and collaboration among people of different cultural and income backgrounds.

The values of cooperation – equity, solidarity, self-help and mutual responsibility – are the corner stones of co-operatives and should be sustained so that cooperatives can continue to benefit that part of the population which lives on under $2 a day.

To give due consideration to the role and contribution of cooperatives in the implementation of and follow-up to the outcomes of social development, two points should be addressed.

a) The actual contribution of cooperatives for the attainment of development goals, more specifically the eradication of poverty and the generation of income should be measured.
b) Taking measures aimed at enabling people living in poverty to engage on a voluntary basis in the creation of employment should be measured.

The government policies for socio-economic development should promote the role of cooperatives as part of an agricultural development strategy for poverty reduction.

Incorporating cooperative concerns and perspectives in the country's poverty reduction programs is one way of promotion which should be widened by involving them in the design, implementation and/or monitoring of the poverty reduction strategy.

The existence of a government agency that deals with the cooperative sector and implements programs on cooperative issues and the adoption of cooperative law in Ethiopia indicates that government has given due consideration to the role and contribution of cooperatives in poverty reduction.

Specifically, government policies should encourage the membership of disadvantaged groups in cooperatives (i.e. women, youth, older persons, persons with disabilities, etc.). In Ethiopia, programs that promote access to cooperatives by the disadvantaged social groups are indicated in the micro and small scale industries in which a significant number of women and youth cooperatives are established. For example in Tigray there are 582 co-operatives with members totaling 338,798 of which 24.2 percent are female. Assuming that these cooperative members are head of households, they account 38.6 percent of the total population of Tigray provided that there are 5 members in each household.

Although the aggregate revenue generated by cooperatives in Ethiopia is not known, the total number of cooperatives is 19,147 with about 1.5 billion Birr capital where the total number of members is 4.6 million of whom 18.8 percent are female.

2.5 Results from Empirical Studies

The HICE survey has been conducted together with WM survey every four-five years since 19995/96. The latest of these HICE surveys is for 2004/5. This survey has produced major findings on various determinants of poverty.

- **Household size: -** The national average household size has decreased from 5 to 4.88 to 4.82 respectively for years 1995/96, 1999/00 and 2004/5. Almost one third of the population are less than 10 years of age and 47.2 percent are less than the lower limit of the normal working age group (15 years). A high proportion (77.6 %) of 0-9 year olds are in households that have 5 household members or more and 69.1 percent of 10-14 year olds live in households that have 6 or more members. There is no structural change in the age composition of national and rural households since 1995. The average proportion of Female Headed Households (FHH) in the lowest quintile has increased significantly from 43.5 percent to 49.5 percent.

- **Education: -** Slightly above one third (37.6 %) of the population are found to be literate. Large gender differences appear to exist with 89 percent of rurally based female heads, in the

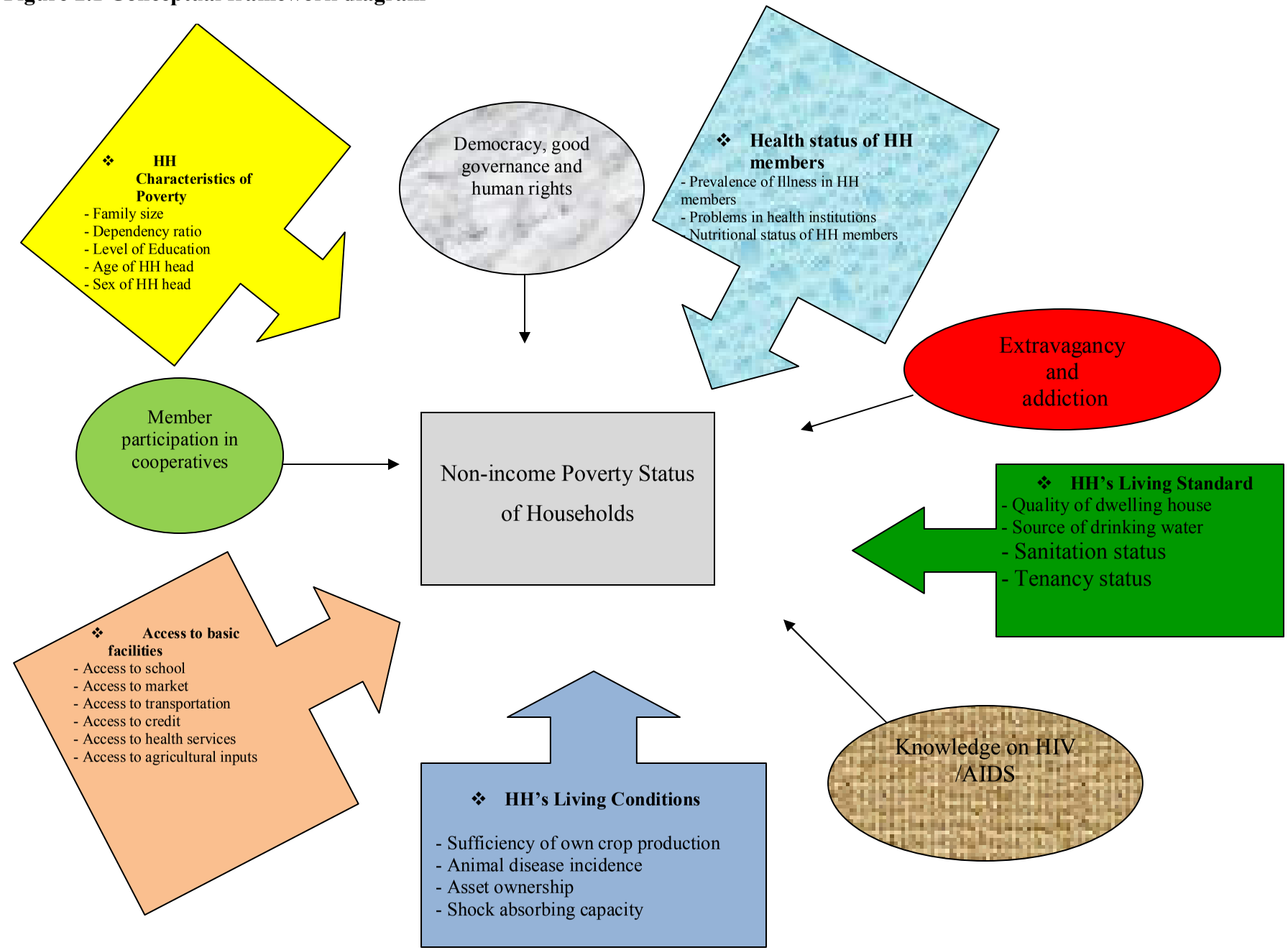
lowest quintile, being illiterate compared with 68.5 percent of men and illiteracy levels decrease as expenditure quintiles increase. For example, the proportion of illiterate rurally based individuals decreases from 73.7 percent and 60.1 percent as we move from the 4^{th} to the 5^{th} quintile. In all regions, average level of female illiteracy is higher than that for males.

- **Dependency Ratio: -** Dependency ratio as obtained from the survey result of HICE in the year 2004/5 at country level is 102 with 65 in urban and 110 in rural. This result is 100 in Tigray. As explained in Mikrie's M.sc Thesis the odds ratio of 1.008 in his study area implied that, ceteris paribus, the probability of falling in poor group increases by a factor of 1.008 as dependent adult equivalent increases by 1 in agreement with the above findings by CSA.
- **Age of household head:** - In Mikrie's research result with the odds ratio of 1.19 for age of household head implying that, other things being constant, the odds ratio in favor of being poor increases by a factor of 1.19 as age increases by 1 year. One possible reason may be that older household heads have larger number of family size as polygamy is common in the area.
- **Livestock owned:** - The survey result of 2004 indicates that the majority of rural households own large proportion of cattle than medium livestock (Sheep and goats). About 68 percent of rural households own cattle, 58 percent own poultry, about 49 percent possess sheep /goats/ and 24 percent own equine animals. Herd size is found negatively related to the probability of being poor in the research area launched by Mikrie in 2005. Most farmers in Tigray and Amhara regions depend on oxen to plough their land and the schedule was designed in such a way that information on households owning oxen could be collected.
- **Livestock disease incidence: -** This variable represents the number of livestock died or the amount of animals lost as a result of various disease incidences. The results of Mikrie's study obviously show that the higher mortality of livestock by disease results in higher probability of the households to fall in poverty. The probable reason provided by Mikrie is that an increase in livestock morbidity and mortality would result in a lower number of animals which implies reduced income and a declining in home food production, eminently contributing to rural poverty (Mikrie, 2005).

From the reviews of empirical studies the identified major research gaps were

1. Research on non-income dimension of poverty at central zone members of cooperatives has not been deeply conducted yet.
2. The researches conducted do not calculate the BMI of adults for malnutrition.

Figure 2.1 Conceptual framework diagram



Chapter III: Materials and Methods

This part deals with the brief description of the study area and discusses the sources and methods of data collection as well as the analytical model employed and the estimation procedure followed during the analysis.

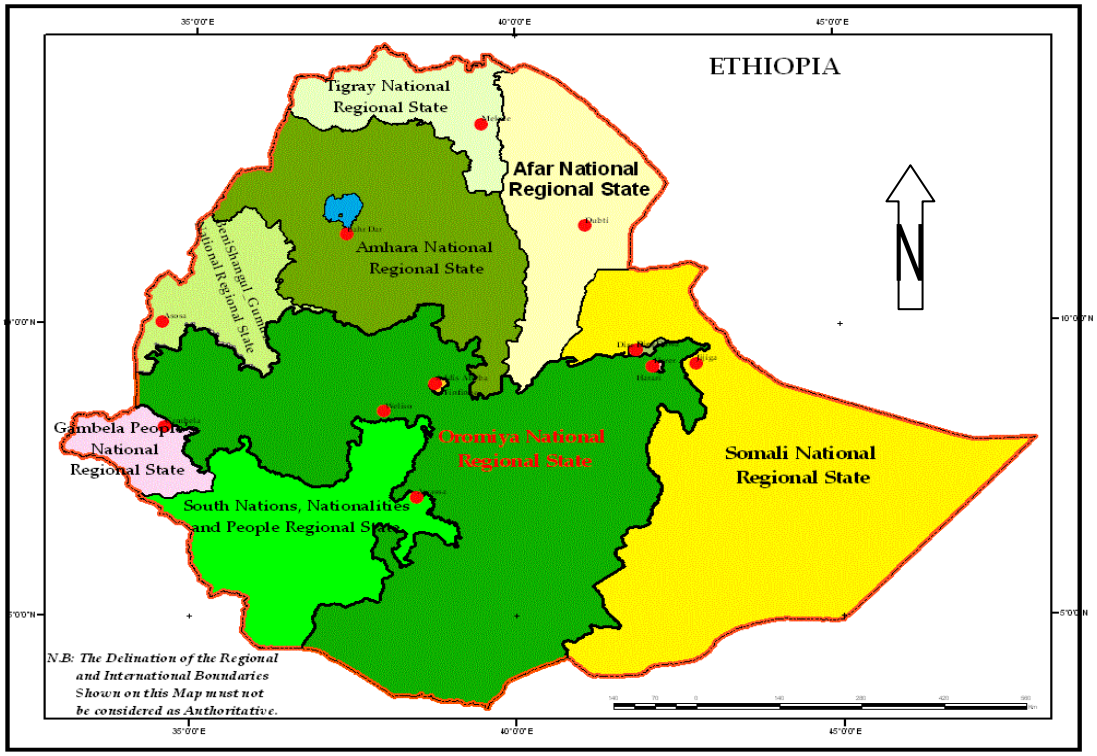
3.1 Description of the Study Area

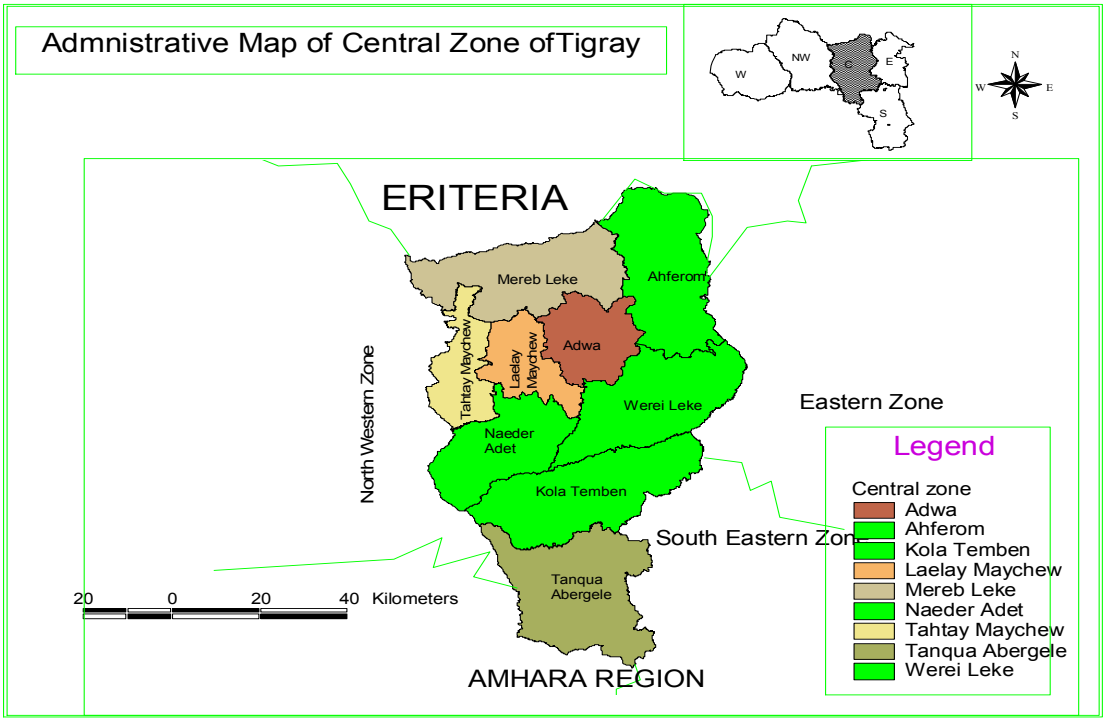
3.1.1 Location

Tigray is located in the North most part of the Country. It stretches along $12^0 15^{'}$-$14^0 57^{'}$ North to $36^0 27^{'}$-$39^0 59^{'}$ East. The total landmass of the region is 54,572.6 Sq.km (BoFED), of which arable land accounts for about 10.8 thousand sq. km. and currently about 10 thousand sq km is under cultivation.

The central zone of Tigray is bounded to the North with Eritrea, to the West with the North Western zone, to the East with the Eastern zone and to South with South Eastern zone of the region and Amhara region. With total area of 9,358.36 Sq.km., Central zone is located in between the geographical coordinates of $38^0$25' to $39^0$20' East and $13^0$10' to $14^0$38' North. This zone is one of the densely populated (127 people per km^2) areas of the country with huge potential work force which comprises of well-known historical mountains like Soloda of Adwa, Work-Amba of Temben, Mountain-chains of Ahsa'a and the miraculous monuments of Axum. Rivers like Tekeze and Mereb with 608 and 440 kilometers in total length respectively (CSA, Statistical Abstract, 2006) and having huge annual water runoff including their tributaries are also found in this zone. Annual water runoff of Tekeze basin is estimated to be about 7.3 billion meter cube. The annual water runoff of Mereb basin is estimated to be about 600 million meter cube. However, currently the amount of water used for irrigation purpose is still at its infant stage known to be not more than 65 million meter cube or 0.8 percent.

Figure 3.1 Administrative Map of Central Zone of Tigray





Regarding the location of the sampled cooperatives, sampling takes you any where from a multipurpose cooperative found near a big town to the one located on the border of the nation. This was what happened in our sampling. Multipurpose cooperative named "May-hamato" is located in "Ahferom" woreda around 50 kms north of Enticho town through "Gerhu–sernay where the last household of the nation is found here in the border of Eritrea. Multipurpose cooperatives named 'Sef'o' and Daero- anbessa' are located on a steep mountains to the east of Enticho town and had it not been for the support of the woreda agricultural & rural development office for transportation to reach the tabias it would have been most difficult to travel from one household to the other after traveling such a long distance on foot.

Two multipurpose cooperatives found in Naedier-adet woreda are 'Lemlem' and 'Fire-qalsi'. Lemlem is located at a two hours walk from the woreda capital 'semema' while Fire-qalsi is found at almost 70 kms from semema town through Axum. However, since there is public transport to reach there, no problem was faced. The third woreda, comprising of three multi purpose cooperatives called 'Dedebit', 'Selam' and 'May-semhal' are found in Werie- leke woreda in between 'Edaga-arbi' and Nebelet towns an area where public transport is available and households located in a plain area.

The last woreda Qola-temben woreda has two multipurpose cooperatives named 'Guna' and 'Shewit'. Guna is located in a Tabia called Santa- gelebeda around 35 kms from Abi-adi town where no public transport is available. 'Shewit' was at one and a half hours walk from the historical place Work-amba. The households in Guna are in a plain area while that of shewit are found in a gully with ups and downs to travel from one household to the other.

3.1.2 Population

According to the population projection of 1994 population and housing census of CSA for 2007, the total population of central zone is estimated to be 1,193,274 comprising of 9 Woredas. 87.39 percent of the population lives in rural areas whereas the urban population accounts only 12.61 percent. From the estimated total population 49.12 percent are male and the rest 50.88 percent are female.

Table 3.1 Population Size of Central Zone by Sex and Woreda for July, 2007

Woreda	Male	Female	Total
Mereb-leke	53,324	54,303	107,627
Ahferom /Enticho/	86,243	94,072	180,315
Werie-leke	73,526	77,686	151,212
Adwa	78,143	80,629	158,772
Laelay maychew	66,754	68,012	134,766
Tahtay maychew	53,324	55,065	108,389
Naedier-adet	56,375	58,626	115,001
Qola-temben	77,847	79,580	157,427
T/Abergele	40,111	39,654	79,765
Total	**585,647**	**607,627**	**1,193,274**

Source: CSA, Statistical Abstract, 2006.

3.1.3 Economic activity

Analysis of results from the 1994 Population and Housing Census show that the total economically active population in rural Tigray was 1,343,063 (50.34 %), of which only 1,153 (0.09%) were members of cooperatives and the overwhelming majority 710,546 (52.90%) being unpaid family workers. The total households living in rural area of Tigray by 2002 was estimated to be 732,000, of which 30 percent were female headed households. The average land holding of the farmers is estimated to be about 1.19 ha, though it varies from 0.5-0.9 ha in the highland areas to 2 ha in the low land parts of the region. Agriculture is the backbone of the regional economy, which engages 90 percent of the working force of the region and bases for the livelihood of the majority of the people in the region.

Major problem of the agricultural system of the region is very traditional and subsistent. The cultivated land of the region is very fragmented, less fertile and the farming system is very traditional. The major crops grown in the region includes sorghum, teff, barley, millet, wheat and maize. The agro-ecological situation of the region is conducive for growing more than 20 varieties of crops but the feeding habits of the population and market problems are believed to influence in limiting the cultivated land by the above mentioned five crops. Regional lose of crop yields due to pests and diseases are roughly estimated to be 30 percent annually. With regard to

weeds Kinche /Conference weed/ and metselem /Straiga/ are the two notorious weeds in the region.

To minimize the effect of drought on crop production irrigation development has got priority in the region. Proper utilization of agricultural inputs, introduction of zero grazing system, doing water and soil conservation activities on arable land and implementing gully stabilization activities are also underway.

3.1.4 Water

The potable water service coverage in rural Tigray grew from 32 percent in 2003 to 41 percent in 2005. On the other side, of the constructed water schemes in the region one out of five does not function because of ownership and maintenance problems after construction.

Table 3.2 Type of Water Schemes Vs Coverage in %

Woreda	Population	Beneficiary	Type of Scheme				Coverage %
			HW	DW	SW	Spring	
Naedier - adet	115,001	53,400	109	2	33	18	46.43
Werie-leke	151,212	150,666	226	-	-	-	99.64
Qola--temben	157,427	65,000	170	-	20	12	41.29
Total	**423,640**	**269,066**	**505**	**2**	**53**	**30**	**63.51**

Source: Data obtained from the water resource & mines office of the woredas, 2007

The ground water potential of the woredas in the survey areas is low. Information obtained from Naedier-adet woreda water resource and mines office for example, indicated that the ground water potential is only 20 percent. Out of the 162 water schemes found in the woreda 15 are non-functional and the number of water schemes within the tabias also varies from 1 in Danga to 20 in G/K/aqui tabia. The percentage of coverage also shows high variation from 8 percent in Danga to 79.9 percent in D/genet tabia. As a result, most of the people use water from unhygienic and unprotected water. Women spend their time in fetching water from far places and information obtained from the office clearly indicated that most people especially children are exposed to different water born diseases.

3.1.5 Education

Time series data obtained from a pamphlet of Tigray region education bureau distributed to show its achievements in the new millennium, the number of students in the region for grade 1-12 has increased from 617,842 to 711,831 to 1,047,976 in 2001, 2004 and 2007, respectively. The number of teachers in Tigray has also climbed from 9,163 to 13,030 to 24,510 for the same grade levels and similarly the number of schools in the region has increased from 915 to 1,100 to 1,726 in the years 2001, 2004 and 2007, respectively.

The total number of schools in central zone of Tigray is 427 of which 412 are elementary schools from grade 1-8. The total number of teachers in central zone is 5,638 of which 1756 (31.15 percent) are female.

3.1.6 Health

Major identified cause of morbidity and death in Tigray, as specified in the strategic plan of the region, are diseases that can be prevented easily like Malaria, TB, respiratory disorders, diarrhea, HIV/AIDS and malnutrition. The health policy developed in the regional plan aims at giving better services to rural dwellers and the main strategy of the policy focuses on prevention. The strategy focuses on mother and children care, health education, environmental sanitation, controlling epidemic diseases, improvement of quality and coverage of basic health services as well as establishment and expansion of health facilities and human resource development.

As a result of the expansion of health infrastructures, primary health coverage of the region was 55 percent in 2003 and at central zone this coverage has dramatically increased to 75 percent with variations 54 percent in G/Adwa to 87 percent in Ahferom Woreda in 2008.

Of the total population of the region the proportion of mother's and children account for about 70 percent. This fraction of population is vulnerable to diseases and is very much exposed to incidence of illness and deaths. The incidence of illness and death in the case of mothers is associated with pregnancy and maternity while in the case of children due to lack of vaccination, respiratory disorders, diarrhea and malnutrition.

3.1.7 Cooperatives:

The regional government has made major efforts to organize and strengthen cooperatives in a new form. The cooperatives in the region are involved in food grain, consumer goods,

agricultural tools and inputs delivery. The services delivered by these cooperatives are expanding from year to year. According to the information on the five years regional strategic plan, in 2004 the cooperatives had spent Birr 11.7 million to provide different services to their members and other beneficiaries and this has increased to Birr 13.5 million in 2005. This implies as stated clearly in the plan the services that the cooperatives are rendering to their members are increasing year to year. Especially, the increment observed in terms of agricultural input delivery was very significant covering 65 percent of the total fertilizer supplied to the farmers all over the region.

According to the explanation on the regional strategic plan cooperatives are also playing major role in providing loans to their members, which enabled them to use modern inputs. Not only the credit provided to cooperative members is increasing but also the problem of paying back is improving. In 2004 for example, 47.9 million birr and in 2005 100 million birr loan was provided to members of cooperatives in the region. The number of cooperatives is also flourishing. There were 788 primary cooperatives and 9 unions in 2004. In 2005, additional 115 primary cooperatives and 8 unions are organized.

Although the status of most cooperatives is good few of them are bankrupted because of sudden falling down of prices, delay in selling of goods purchased, lack of market assessment, high running costs and poor management.

3.1.8 Tourism

In general, Tigray has got historical, cultural and natural heritage places that serve as tourist attraction sites and in particular with no exaggeration if we squeeze Ethiopia we will ultimately arrive at central zone of Tigray. A place of many Kingdoms and ancient heritages of Axum, Adwa a place where the greatest victory of the millennium was attained through Ethiopians united to defeat aggressors, the birth place of different heroes with its miraculous mountain chains of Ahsa'a is found in the central zone of Tigray. However, the contribution of the sector to the regional economy though improving is quite low. The development of the existing poor infrastructures and services coupled with enhancing the image of the region through development and promotion could be good job opportunity to the cooperatives found in the zone.

3.2 Criteria of Selection for the Central Zone

1. Central zone comprised the highest population number as compared to other zones of the region (see annex 1for details).
2. The largest number of cooperatives was found in this zone (see annex 1for details).
3. The largest number of woredas comprising of the former 3 Awrajas were found in the central zone (see annex 1for details).
4. Researchers were usually interested to undertake their research in the Eastern and Southern zones of the region for proximity, infrastructure and budgetary reasons which inevitably led to respondents' reluctance to answer questions and other research duplication and biases.

Therefore, the Central zone was chosen appropriate for this research according to the above mentioned reasons. Accordingly, four woredas of the central zone of Tigray regional state were selected for the study. One of the 6 zones in the region, central zone, had 9 woredas with a total population of 1,193,274 (CSA, Statistical Abstract, 2006) and there were 191 multi-purpose primary cooperatives.

3.3 Sources and Method of Data Collection

A number of different methods can be employed while undertaking surveys which depend on the objectives of the survey, type of data required for the analysis and availability of resources. This survey has made use of primary data sources collected from multi-purpose primary cooperative member households. The data in the survey was collected using structured interview schedule. Data from secondary sources were also used to supplement the primary sources. The interview schedule was pre-tested before final demonstration to respondents.

3.3.1 Pilot Study

One of the preparatory works in research areas is conducting pilot studies. Thus, a pilot study was conducted to review and assess lessons, to test the survey instruments, the reaction of respondents and the different technical and financial requirements of the main survey.

The researcher according to his work plan had launched a pilot study in Enderta Woreda, May-tsedo Tabia, Debre-genet multi purpose primary cooperative. For this survey on "Non-income Dimensions and Determinants of Poverty of Members of Cooperatives in Central Zone of

Tigray" training for the enumerators and supervisors, who were responsible for the data collection operation, was conducted by the researcher. The participants were selected from Central Statistical Agency (CSA) with long time experience in data collection. The training, which lasted for two days, consisted of theoretical discussions on how to complete the schedule as well as practical interview of households and/or household members. Thorough discussions were made after field practice intended to help exchange experiences among participants and pinpoint the areas of survey questions which need more care and attention.

3.3.2 Facilitators

Facilitators were key actors in the process of data collection. Facilitators served as a bridge between data collectors and the sampled households. Therefore, for the main survey we communicated with the respective Woredas in the survey areas to make facilitators ready before our arrival and to pre-inform the randomly selected households according to the schedule set forth for them.

The enumerators were supported by guides who are selected from each tabia with full knowledge of the area and the members of cooperatives. The guides helped in facilitating the data collection process by carrying the anthropometric devices of the enumerators and taking them to each selected household. The enumerators were equipped with adequate pencils, erasers, pencil sharpeners and bound schedule per 10 households per multipurpose cooperative to make handling comfortable. The facilitators were paid 30 Birr per day per person.

3.3.3 Sample Design:-

For the purpose of the survey the central zone was divided into 3 categories, as

1. Temben area
2. Adwa area
3. Axum area

Number of woredas selected from each category was proportional to size, i.e. one woreda from Temben and Axum areas and two woredas from Adwa area.

Woreda from each area was selected according to the number of cooperatives in that woreda, i.e., Woreda with the highest number of cooperatives was automatically selected.

From the frame collected in the central zone of Tigray, which account of 191 multi purpose primary cooperatives, a two-stage cluster sample design in which the Primary Sampling Units (PSU) were used to select 10 sample cooperatives, sample being proportional to size. 20 member households from a list of each multi-purpose primary cooperative was selected as a second stage sampling unit (SSU) to which survey schedule finally was administered to the members of sample households. Both Sample Cooperatives and Sample households were selected using systematic random sampling (SRS) technique without replacement to avoid sampling biases.

Table 3.3 Woredas in Central Zone

Ser No.	Name of Woreda	Number of Multi-purpose Cooperatives	Selected Woreda	No. of Coops selected
1	**Temben Area**			
1.1	Qola Temben	24	√	2
1.2	Tanqua - Abergele	14		
2	**Adwa area**			
2.1	Werie Leke	26	√	3
2.2	Adwa	16		
2.3	Ahferom	25	√	3
2.4	Mereb Leke	22		
3	**Axum area**			
3.1	Laelay Maychew	14		
3.2	Tahtay Maychew	16		
3.3	Naeder-det	18	√	2
4	Total		4 Woredas	10 Cooperatives

Source: ARDB, Cooperative Promotion Section.

Two woredas were selected from the Adwa area because the number of woredas and the number of cooperatives in that area was larger than the Temben and Axum areas. Central zone was considered to be a survey domain (i.e. reporting level for which the major findings of the survey are reported).

3.3.4 Sampling Technique

The list of all multi-purpose primary cooperatives from each selected woreda was used to identify that cooperative to be included in the survey using systematic random sampling method (see annex 2 for details). The list of all multi-purpose primary members of cooperatives from each Tabia cooperative promotion office was used as a frame to select the sample household members of co-operatives in the rural areas of the selected 4 woredas of central zone of Tigray. The general idea is that in spite of taking few cooperatives and including large sample households in the survey, increasing the number of cooperatives and selecting relatively small number of members from each cooperative without affecting its representative nature is statistically more reliable. This approach increased the cost, time and energy spent by the researcher but it had the advantage of addressing the variability that exists between groups than the less variability existing with in groups and helped in extending geographical coverage of the survey area.

There are several approaches to determine the sample size. These include a census for small population, imitating a sample size of similar studies, using published tables and applying formulas to calculate a sample size.

This study applied a simplified formula provided by Yamane, (1967) as cited by Yilma Muluken to determine the required sample size at 95% confidence level, degree of variability = 0.5 and level of precision = 9%.

$$n = \frac{N}{1+N(e)^2}$$

Where ‘n’ is the sample size, N is the population size (total household size), and ‘e’ is the level of precision.

Table 3.4 Number of Members and Household Members in a Cooperative

Ser No.	Name of Woreda	Name of Cooperative	Number of Members			Number of Household Members		
			M	F	T	M	F	T
1	Qola Temben	Shewit	664	41	705	1,387	1,790	3,177
		Guna	450	80	530	1,443	1,469	2,912
2	Werie-leke	May semhal	511	125	636	1,602	1,619	3,221
		Selam	570	66	636	1,705	1,603	3,308
		Dedebit	361	58	419	1,359	1,207	2,566
3	Ahferom	May hamato	366	234	600	---	---	---
		Daero Anbessa	152	15	167	---	---	---
		Sef'o	323	60	383	---	---	---
4	Naedier-adet	Fire qalsi	213	56	269	767	746	1,513
		Lemlem	94	30	124	---	---	---
Total	**4 Woredas**	**10 Cooperatives**	**3,704**	**765**	**4,469**			

"--- "designates "data not available".

Source: Woredas Cooperative Promotion and Registration Sections.

Applying the formula given above 120 sample size could suffice to represent the universe 4,469 members of cooperatives. However, the researcher planned to collect data from 200 households for two reasons;

- Increasing sample size increases precision.
- As the sampling was sampling without replacement, whenever households are missed for some reason enumerators will not replace them by another households, which ultimately diminishes the sample size. Hence, increasing sample size became compulsory.

Therefore, the researcher targeted to collect data from 200 households and managed to collect data from 174 households which is 87% achievement. This is because some households where deported to Eritrea, some migrated to Humera and some others migrating to towns. As compared to the representative 120 sample households, the achievement is 145%. Therefore, adequate sample is collected for analysis (see table 3.5).

Table 3.5 Central Zone - Sample Size Selected

S/N	Woreda	Tabia	Multipurpose Cooperative	Minimum Sample Size Required	Targeted Sample Size	Achieved Sample Size
1	Ahferom	May-hamato	May-hamato	12	20	16
2	Ahferom	Sef'o	Sef'o	12	20	17
3	Ahferom	Adi-satra	Daero-anbessa	12	20	18
4	Naedier-adet	Ruba-adet	Lemlem	12	20	17
5	Naedier-adet	Metaklo	Fire-qalsi	12	20	19
6	Werie-leke	Edaga-hamus	Dedebit	12	20	18
7	Werie-leke	Arena	Selam	12	20	17
8	Werie-leke	Mis-ema	May-semhal	12	20	19
9	Qola-temben	Santa-gelebeda	Guna	12	20	17
10	Qola-temben	Selam	Shewit	12	20	16
Sum				**120**	**200**	**174**

Source: Own survey, 2008

Table 3.6 Distribution of sample cooperatives and households by domain of study

Zone	Domain of study	Total number covered in the survey	
		Sample cooperatives	Sample households
Central	4 woredas	10 cooperatives	174 households

Source: Own Survey, 2008

3.3.5 Secondary Data

To support the major findings obtained from the primary data, the researcher has also collected relevant data from central zone administration office and from the 4 woredas found in the survey areas. The main data collected are on:

- Education related indicators from woreda education office.
- Health related indicators from woreda health office.
- Water related indicators from woreda water and mining office.

3.4 Anthropometric Measurement Devices

The researcher was unable to obtain anthropometric devices to be rented. Therefore, the alternative solution was to buy 2 devices for measuring children and another 2 to measure members of households greater than 5 years of age. The measuring devices for children less than 5 years of age were perfectly working in the field while the devices bought for measuring adults were not reliable.

3.5 Data Quality Issues

The handwriting of the enumerators was attractive and it was observed that precision increased as the enumerators got adapted to the schedule.

The schedule was a standard schedule designed to be appropriate for both enumerators and respondents. The experience of the enumerators in data collection also helped in the timely collection of the data and its quality. The schedule was also tested by a computer programmer in SPSS statistical package and found workable. Hence 200 schedules including 5 percent reserve consisting 18 pages each were duplicated. Deployment was conducted on Sunday 23/12/2007. Data collection started on Monday 24/12/2007 and ended on 16/1/2008. The researcher himself, one supervisor and 2 enumerators had done the job of data collection.

The researcher has tried utmost to be genuine to his profession. All data are collected by direct interview from each randomly selected household. Replacement was not allowed to avoid biases. The objective of the survey was briefly explained by the researcher to each woreda cooperative promotion office and all the selected households were pre-informed about the survey before our arrival by the guides. As a result, respondents were fully cooperative.

3.6 Plan of analysis

3.6.1 Analysis

Several studies indicate that the state of poverty is influenced by an interwoven and interacting set of demographic, socio-economic and other characteristics of household members. Therefore, appropriate models accommodating all aspects of data is required to come up with feasible and relevant outcomes.

Based on this, the first poverty measure, the head count index or incidence of poverty defined as the share of the population that has an income y that is less than the poverty line z was identified. If the population size is **N** and the share of poor people is **q** then the poverty headcount is given by:

$$\mathbf{H = q/N} \qquad \mathbf{(1)}$$

After distinguishing the poor from the non-poor using standard absolute poverty line, the second step was to use the binary logistic regression model to examine an association of the factors with poverty. The model is used to approximate the mathematical relationships between the explanatory variables and the dependent variable.

Models which include yes or no type dependent variables are called dichotomous or dummy-variable regression models. Such models approximate the mathematical relationships between explanatory variables and the dependent variable that is always assigned qualitative response variables (Gujarati, 1988; 1985; Pindyck and Runbinfeld, 1981). These include the linear probability function, logistic distribution function (logit) and normal distribution function (probit).

The logit and probit models guarantee that the estimated probabilities will lie between logical limit 0 and 1 (Pindyck and Runbinfeld, 1981). Because of this and other facilities, the logit and the probit models are the most frequently used models when the dependent variable happens to be dichotomous (Liao, 1994; Gujarati, 1988; and Pindyck and Runbinfeld, 1981).

In fact, the choice of this model also revolves around practical concerns such as the availability and flexibility of computer program, experience and other facilities like its representation of close approximation to the cumulative normal distribution. Hosmer and Lemshew (1989) pointed out

that a logistic distribution has got advantage over others in the analysis of dichotomous outcome variable. There are three primary reasons for choosing the logistic distribution.

These are:

1. from a mathematical point of view, it is an extremely flexible and easily used function, and
2. It lends itself to a reasonably meaningful interpretation.
3. It can be used to assess the predictive power of various variables used for means-testing.

After critical investigation of the strength, drawbacks and assumptions of different models, the multiple logistic regression models were employed to address the objectives of the survey. In this model the dependent variable takes a value of 1 if the household belongs to below poverty line, i.e. poor with the probability of P_i, otherwise a value of 0, i.e. non-poor with the probability of 1-P_i. To estimate this type of relationship, it requires the use of qualitative response models.

Specification of the model is as follows,

$$P_i = \frac{e^{Z_i}}{1+ e^{Z_i}} \qquad (2)$$

Where, P_i is 1 the probability that the household is poor; 0 otherwise.

$$Z_i = a_o + \Sigma a_i X_i + u_i \qquad \text{where, } i = 1, 2, 3, \ldots, n \qquad (3)$$

n = the number of explanatory variables

a_o = intercept term

a_i = the coefficient of explanatory variables

u_i = disturbance term

X_i = explanatory variables such as sex of the household head, access to basic facilities, level of education, knowledge on HIV/AIDS, possession of household assets, etc.

The probability that the household belongs to non-poor will be (1-P_i). That is,

$$1-P_i = \frac{1}{1+ e^{Z_i}} \qquad (4)$$

The odds ratio can be written as:

$$e^{Z_i} = \frac{P_i}{1-P_i} \qquad (5)$$

In linear form by taking the natural log of odds ratio:

$$\ln(P_i/1-P_i) = \ln(e^{Z}_i) = Z \qquad (6)$$

The coefficients of the logit model present the change in the log of the odds (poverty as a 0 or 1) associated with a unit change in the explanatory variables (Hanushek and Jackson, 1977 as quoted by Edilegnaw, 1997).

Other qualitative and quantitative analytical techniques were also be used to describe and analyze the available data to achieve the objectives set.

3.6.2 Estimation Procedure

After completion of the data collection, the responses were coded and entered into **SPSS** Statistical software version 11 for analysis.

Similar to the income dimension, we define 'poverty lines' for the non-income dimensions based on a reasonable (but essentially arbitrary) notion of who should be considered as poor in the relevant dimension (Isabel Gunther and Stephan Klase, May 2007). The question arises as to which non-income indicators should be analyzed. For a theoretical discussion of temporary and long-term wellbeing, an analysis of a very broad range of functioning might be appropriate, but it could be more useful to focus on a smaller subset of basic functioning for empirical studies. The researcher therefore, focused on minimum capabilities of households of members of cooperatives on education, health, nutrition, housing conditions & amenities, access to basic facilities and vulnerability to shocks. Therefore, based on the food consumption behavior and expenditure pattern of the community in the study area a basket of food items actually consumed by the households is valued from local market prices and actual expenditures on non-income items by the households were listed. According to literatures the poverty line in Ethiopia is Birr 1075.00 which was estimated by 1995/96 HICE & WM Survey based on a basket providing 2200 Kcal per adult equivalent per day. The poverty line for rural Tigray according to the HICE survey of 1995/6 was found to be birr 1,176.066 of which food expenditure accounts birr 753.054 and non-food expenditure accounting birr 423.012. Taking constant price at 1995/96 when adjusted to 2008, the total poverty line for rural Tigray was found to be Birr 1938.69 with food expenditure Birr 1,335.58 and non-food expenditure accounting Birr 603.10 (Zenaselassie Seyoum, household Budget & Welfare monitoring statistics, CSA).

Once we have identified the poor and non-poor groups of households by taking the non-food expenditure into account, the next step is to pinpoint characteristics that are correlated with poverty and that can be used for targeting interventions. Such important household characteristics, which potentially affect the level of household poverty, would be identified using logistic regression models. In other words, the likelihood that the given household characteristics threaten the welfare of the household would be searched.

As a result, in order to investigate the determining factors for state of poverty a binary logistic regression model was used. The dichotomous dependent variable is regressed on a series of socio-economic and demographic characteristics that are identified and included as explanatory variables. The dependent variable in this case is a dummy variable, which takes a value of one or zero depending on whether or not a household is poor. Thus the main purpose of a qualitative choice model is to determine the probability that an individual with a given set of attributes will fall in one category rather than the other, i.e. poor /non-poor. Hence, in line with the literature on income poverty, we treat poverty in the income and non-income dimensions as a dichotomous yes/no question and thus will not consider its depth or severity.

As mentioned above, the dependent variable is of a binary nature. Hence, it is assigned a value of 0 or 1, representing non-poor or poor, respectively. To estimate the values of constant term (a_0) and coefficients of the parameters (a_i's) of the logistic model, a set of data was fitted into equation 3 (See page 36) above.

Before estimating the logit model, it is necessary to check if multicollinearity exists among the continuous variables and verify the associations among discrete variables. The reason for this is that the existence of multicollinearity will affect seriously the parameter estimates. If mulicollinearity turns out to be significant, the simultaneous presence of the two variables will attenuate or reinforce the individual effects of these variables. Needless to say, omitting significant interaction terms incorrectly will lead to a specification bias. In short, the coefficients of the interaction of the variables indicate whether or not one of the two associated variables should be eliminated from model analysis. Accordingly, Variance Inflation Factor (VIF) technique was employed to detect the problem of multicollinearity for continuous explanatory variables (Gujarati, 1995). Each selected continuous variable is regressed on all the other continuous explanatory variables, the coefficient of determination (R_j^2) being constructed in each case. If an approximate linear relationship exists among the explanatory variables then this will

result, in a 'large' value for R_j^2 in at least one of the test regressions. A popular measure of multicollinearity associated with the VIF is defined as:

$$VIF(X_j) = (1 - R_j^2)^{-1} \quad (7)$$

A rise in the value of R_j^2 that is an increase in the degree of multicollinearity, does indeed lead to an increase in the variances and standard errors of the **OLS** estimates. A VIF value greater than 10 (this will happen if R_j^2 exceeds 0.90), is used as a signal for existence of severe multicollinearity (Gujarati, 1995).

Similarly, there may be also an interaction between qualitative variables, which can lead to the problem of multicollinearity or strong association. To detect this problem, coefficients of contingency were computed from the survey data. The contingency coefficients are calculated as follows:

$$C = \sqrt{\frac{\chi^2}{n+\chi^2}} \quad (8)$$

Where C is coefficient of contingency, χ^2 is chi-square test and n = total sample size. The values of contingency coefficient range between 0 and 1, with zero indicating no association between the variables and values close to 1 indicating a high degree of association which means high degree of multicollinearity.

3.6.3 Variables

Poverty and poverty changes are affected by both macro- and micro- economic variables. Obviously, the overall economic and social development of a country will also be an important determinant of poverty – whether jobs are created through economic growth, in which sectors such growth occurs and whether the fruits of growth are spread equally or benefit certain groups in society more than others.

In analyzing poverty, it is necessary to identify the potential explanatory variables and describe their measurements. Different variables are expected to affect the level of poverty in households of members of cooperatives. The major variables expected to have influence on the cooperative

member households to be under poverty or not from the non-income dimension are explained below.

3.6.3.1 The Dependent Variable of the Model: - the cooperative member household poverty status, which is the dependent variable for the logit analysis is a dichotomous variable representing the status of household poverty. It is represented in the model by 1 for poor and 0 for non- poor cooperative member households. The information to categorize households into two groups can be obtained by comparing the total household expenditure per annum to the minimum level of expenses required for consumption and non-consumption expenses like health care, education, short term loan, nutrition housing status, usage of facilities, possession of household assets and shock coping mechanism.

3.6.3.2 The Independent Variables of the Model: - the independent variables expected (hypothesized) to have association with poverty status, are selected based on available literature and through key questions in addressing multiple correlates of poverty. These are:

1. Building on the poverty profile, which are important variables that are correlated with non-income dimension of poverty and can be included in the correlation analyses?
2. Are such factors directly linked to non-income poverty, or are other non-measurable factors responsible?
3. Which factors cannot be captured directly or indirectly through surveys but are likely to determine non-income poverty levels of households?

Further efforts were made to incorporate demographic and socio-economic factors which are feasible and relevant in measuring the non-income level of poverty in the rural central zone of Tigray members of cooperatives. Any exogenous variable having negative coefficient is expected to reduce poverty where as explanatory variable found to be positively related to the poverty status will deteriorate the wellbeing of the households. The associated hypotheses of the survey with respect to each one of the variables is presented below.

a) Family Size: - It is hypothesized that family size is expected to have positive association with non-income poverty and negatively affect the household's wellbeing.

b) Dependency Ratio: - It is hypothesized that the family with relatively large number of dependent family members (high dependency ratio) has a direct relation with household non-income poverty status.

c) Age of the Head of Household: - this is a continuous explanatory variable designating age of the household head. It is hypothesized that older age of the household head is positively associated to the non-income dimension of household poverty.

d) Livestock Ownership: - It is hypothesized that as the number of livestock increases, the non-income poverty status of the household reduces.

e) Distance from Market Centre: - Proximity to market centers is hypothesized to affect non-income poverty negatively.

f) Sex of the Household Head: - It is expected that female-headed households are under non-income poverty than male headed households.

g) Getting Services from Cooperatives: - It is hypothesized that households who get services from their association are non-poor in the non-income dimension.

h) Animal Disease Incidence: - It is expected that existence of animal disease incidences will deteriorate the livelihood of the cooperative member households and it will have positive impact in aggravating non-income poverty.

i) Ability of the Household Head to Read and Write: - It is hypothesized that the ability of household head to read and write has positive contribution to the welfare of the family.

j) Health Condition of the Household: - It is hypothesized that the health status of members of a household has an effect on the welfare of the family.

k) Nutritional status of members of the household: - It is hypothesized that the nutritional status of households affects the level of non-income poverty.

l) Access to selected basic facilities: - It is hypothesized that the access of households to basic facilities affects their level of non-income poverty.

m) Status of housing, housing facilities and tenure: - The type of housing, housing facilities and tenure is hypothesized to negatively related with non-income poverty.

n) Possession of Household Assets: - It is hypothesized that households who own asset are non-poor.

o) Coping mechanism for contingencies: - It is hypothesized that households capable of raising 100 Birr for all contingencies in a week's time are non-poor in the non-income dimension.

p) HIV/AIDS knowledge: - It is hypothesized that households with knowledge of HIV/AIDS infection and prevention methods are non-poor in the non-income dimension.

q) Democracy, good governance and human rights (DGH):- It is hypothesized that members of cooperatives who participate in political activities and have access to the legal system are non-poor in the non-income dimension.

r) Extravagancy: - It is hypothesized that households with extravagant spending pattern are non-income poor.

s) Addictions: - It is hypothesized that households addicted with alcohol or other drugs are non-income poor.

3.6.4 Testing for the robustness of poverty

The fact that non-income poverty calculations are based on a sample of households, or a subset of the population, rather than the population as a whole, has implications. Samples are designed to reproduce the whole population, but they can never be exact since the information does not cover all households in the universe. Samples carry a margin of error, and so do the poverty measures calculated from household surveys. The standard errors, which most statistical packages will easily calculate, depend on the sample design – stratification and clustering, essentially … and the sample size in relationship to the size of the total population.

When the standard errors of non-income poverty measures and the coefficient of variation of selected variables are large, it may well be that small changes in poverty, although observed, are not statistically significant, and there by cannot be interpreted for policy purposes. Hence, attention was paid to these significance levels when interpreting the results.

Chapter IV: Results and Discussion

This chapter presents the results of various measurements. Findings from analysis of poverty through use of head count index, descriptive statistics and econometric model are provided and discussed below. The descriptive analysis made use of tools such as mean, percentage, standard deviation and frequency distribution.

4.1 Non-income Dimensions of Poverty

To achieve the first objective of the study, the contribution of the non-income dimensions of poverty to members of cooperatives has been assessed. The results of the findings are provided below.

4.1.1 Measuring the Poverty Status of HHs of Members of Cooperatives

Households of members of cooperatives were arbitrarily categorized into poor and non-poor for convenience based on the results obtained from this survey on annual expenditure of households on consumption and non-consumption items and comparing the results against the poverty line for the region. The poverty line for rural Tigray according to the HICE survey of 1995/6 conducted by CSA was found to be birr 1,176.066 of which food expenditure accounts birr 753.054 and non-food expenditure accounting birr 423.012. Taking constant price at 1995/96 when adjusted to 2008, the total poverty line for rural Tigray was found to be Birr 1938.69 with food expenditure Birr 1,335.58 and non-food expenditure accounting Birr 603.10 (Zenaselassie Seyoum, HH Budget & Welfare monitoring statistics, CSA).

Therefore, comparing the non-food expenditure component calculated from the data available against the results of non-food expenditure component deflated to 2008 for rural Tigray, 47 sample households (27%) were poor and 127 sample households (73%) were found to be non-poor.

4.1.2 Household Characteristics and Poverty

The average household size for members of cooperatives in rural central zone of Tigray is found to be 5.37 while the average household size for the rural country is 4.9 and the percentage of households with family size less than five account only 33.4 percent (see table 4.1).

Households with family size between 5 and 8 account 65.0 percent indicating relatively high fertility in the area. About 16 percent of the households are found to be female headed.

Table 4.1: Family size of the households.

Family size	Count	Percent
1 -2	17	9.8
3 – 4	41	23.6
5 – 6	64	36.8
7 – 8	49	28.2
9 – 10	3	1.7
Total	174	100.0
Mean family size	**5.37**	

Source: Own survey – January, 2008.

4.1.3 Dependency Ratio

Dependency ratio is defined as a quotient between the population assumed to be not economically productive (i.e. sum of the population aged 0 to 14 years and those aged 65 years and above) and population assumed to be economically productive (the population at working age group, i.e. age 15 to 64 years).

This ratio is usually expressed in percentage and is used as a measure of economic dependency on those who are in the working age groups.

The dependency ratio is computed to be 105 which implies that every 100 persons at economically productive age group is responsible to take care of themselves and additional 105 persons (children and aged population) indicating the burden of dependencies on the rural working age population of the members of cooperatives in central zone of Tigray.

4.1.4 Employment

Respondents were asked questions to elicit their employment status in the 12 months prior to the survey. Eighty-two percent of the respondents worked during the 12 months prior to the survey

and nearly 18 percent did not work at all. Of those who were not involved in income generating activities 83.9 percent of them were students. Too old to work, sick people and idle accounted 4.8 percent, 4.0 percent and 2.4, respectively. The data shows that those people who were willing to work but unable to find job are only 1.6 percent.

The findings in the table below reveals that the main occupation (99.1 percent) of the rural members of cooperatives who were involved in income generating activities was getting involved in private work most likely to be self-employed in agriculture.

Table 4.2: Response regarding involvement in any economic activity.

			Count	Percent
Were you involved in any income generating activity during the last 12 months	Yes	Male	290	43.3%
		Female	258	38.6%
		Total	548	81.9%
	No	Male	57	8.5%
		Female	64	9.6%
		Total	121	18.1%
Reason for not involvement	Unable to find job		2	1.6%
	Idle		3	2.4%
	Student		104	83.9%
	Too old		6	4.8%
	Sick		5	4.0%
	Other		4	3.2%
Total			124	100.0%
Occupation	Employer		2	.4%
	Private work		548	99.1%
	Civil servant		3	.5%
Total			553	100.0%

4.1.5 Education

4.1.5.1 Literacy Rate

The surest way to fight ignorance is by promoting education. Every member of the households aged 5 years and over was asked to state whether he/she is literate or not. Of the total population in the survey area 48.7 percent are found to be literate much higher than the national average for rural which is only 30.9 percent. The main reasons for not attending normal education was found to be parents did not let me attend, there was no school at the nearby and not at school age (too

young) with 50.1 percent, 22.4 percent and 12.6 percent, respectively. Economic problem for not attending school accounted only 3.3 percent.

Table 4.3: Response regarding attending formal education system

		Count	%
Did you ever attend education through the formal education system?	Yes	398	48.7
	No	419	51.3
Total		**817**	**100.0**
If no, Reason for not attending?	Engaged in other work	2	.5
	Parents didn't let me attend	210	50.1
	Economic problem	14	3.3
	No school at the nearyby	94	22.4
	Sick	4	1.0
	Not understanding the use of education	1	.2
	Not at school age, too young.	53	12.6
	Not at school age, too old.	3	.7
	Disable	2	.5
	Other	36	8.6
Total		**419**	**100.0**

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.5.2 Educational Attainment

Educational attainment refers to the highest grade a person ever completed. The categories of education in this report adheres to the Tigray Region Bureau of Education classification of grades and include grades 1-4, grades 5-8, grades 9-10 and grades 11-12. Population by the highest grade completed is presented in table 4.4 and bar graph 4.1 below.

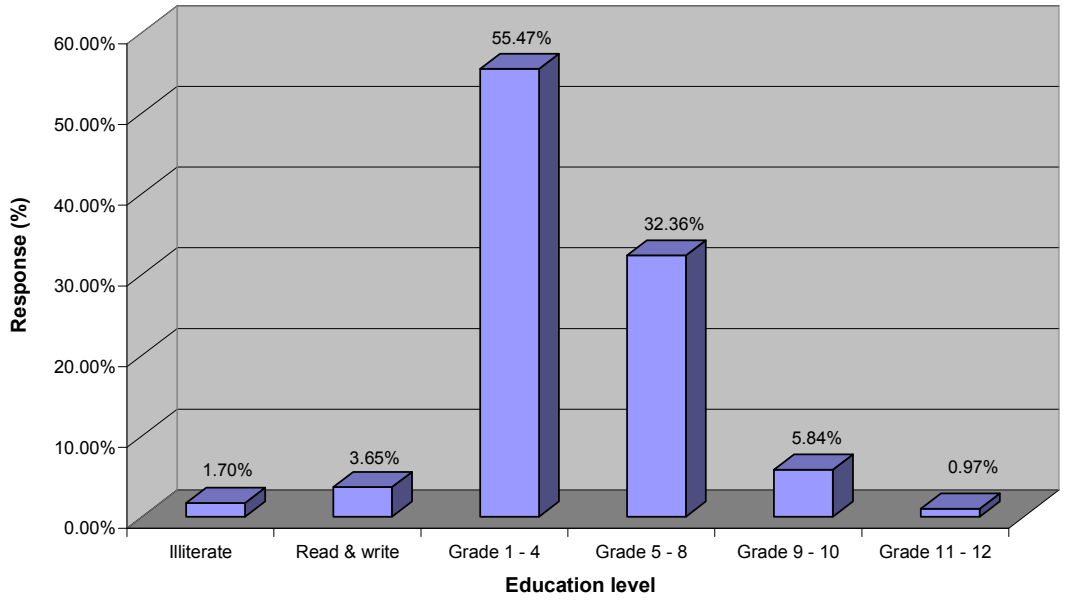
The survey results showed that most of the population has only attained primary level. More than 50 percent of the population had completed grades 1-4 and around 88 percent had completed grades 1-8. Only 5.8 percent and 1.0 percent had completed grades 9-10 and grades 11-12, respectively indicating that significant proportion of the population is in primary school.

Table 4.4: Highest level of education attained

		Count	Percent
Highest level of education attained	Illiterate	7	1.7
	Read & write	15	3.6
	Grade 1 - 4	228	55.5
	Grade 5 - 8	133	32.4
	Grade 9 - 10	24	5.8
	Grade 11 - 12	4	1.0
Total		411	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.1 Educational Attainment



4.1.5.3 Gross Enrollment Ratio

a. Gross Enrollment Ratio for Grade 1-4

One of the indices used for measuring the progress in the rate of absorption of the eligible population to the school system is gross enrollment ratio. The gross enrollment ratio for lower primary level is defined as the total number of pupils attending in grades 1-4 during the current school year divided by the total number of children of lower primary school age (7-10 years).

The Gross Enrollment Ratio (GER) in 2008 for the grades 1-4 has reached 112.65 for both sexes and 117.47 for male and 107.45 for female in rural central zone of Tigray. However, it can be

observed from the table below that the gross enrollment ratio for female is smaller than their male counterparts. Comparing the results against the regional results, the gross enrollment ratio (GER) in central zone is lower for both sexes. The change in the decline of gross enrollment ratio from the year 2007 to 2008 is slightly better for male. However, the change in the decline of gross enrollment ratio observed is high for female in 2008 as compared against the 2007 gross enrollment ratio at regional level for example, percentage change in decline of 9.48 for male and 11.16 for female is observed.

Table 4.5 Gross Enrollment Ratio by Woreda, Gender, Zone and Region -2008

Woreda	Gross Enrollment Ratios											
	1-4			5-8			1-8			9-10		
	M	F	T	M	F	T	M	F	T	M	F	T
N/ Adet	118.34	106.72	112.51	4.1	49.66	45.35	82.47	80.55	81.51	20.09	19.74	19.91
Werie-leke	123.03	113.35	118.14	92.42	97.18	94.8	108.8	105.91	107.35	65.31	55.9	60.62
Q/Temben	134.09	108.5	121.37	50.84	51.74	51.28	95.45	82.49	89.04	6.74	4.44	5.62
Ahferom	114.28	104.34	109.18	106.03	105.07	105.54	110.44	104.67	107.5	58.89	43.17	50.93
L/Maychew	105.09	99.92	102.51	90.55	111.7	100.98	98.34	105.32	101.8	23.75	23.98	23.86
M/ Leke	105.58	94.15	99.91	67.18	68.03	67.59	87.71	82.12	84.95	40.7	28.08	34.53
T/Maychew	106.65	103.94	105.3	86.07	97.88	91.91	97.07	101.15	99.1	45.32	40.91	43.15
G/ Adwa	129.58	119.79	124.7	85.5	103	94.12	109.12	112.1	110.59	5.09	4.49	4.8
T/Abergele	115.29	115.67	115.48	60.03	67	63.41	89.6	93.3	91.4	16.85	9.57	13.35
C/Zone	**117.87**	**107.45**	**112.65**	**75.52**	**83.47**	**79.44**	**98.98**	**96.85**	**97.91**	**33.96**	**27.81**	**30.09**
Region	**119.89**	**113.62**	**116.78**	**75.91**	**82.39**	**79.11**	**99.36**	**99.15**	**99.25**	**44,76**	**40.31**	**42.58**

Source: Tigray Education Bureau, 2008

b. Gross Enrollment Ratio for Grade 5-8

The gross enrollment ratio for higher primary level is defined as the total number of pupils attending in grades 5-8 during the current school year divided by the total number of children of higher primary school age (11-14 years).

The Gross Enrollment Ratio (GER) in 2008 for the grades 5-8 is found to be 79.44 for both sexes and 75.52 for male and 83.47 for female in rural central zone of Tigray (see table 4.5 above). The gross enrollment ratio is a little bit higher in favor of female than their male counterparts and no significant difference is observed in the gross enrollment ratio as compared with the regional results.

c. Gross Enrollment Ratio for Grade 1-8

The gross enrollment ratio for primary level is defined as the total number of pupils attending in grades 1-8 during the current school year divided by the total number of children of primary school age (7-14 years).

The Gross Enrollment Ratio (GER) in 2008 for the grades 1-8 is found to be 97.91 for both sexes and 98.98 for male and 96.85 for female in rural central zone of Tigray. The results show gender bias in favor of male. Lower achievement is also observed in the gross enrollment ratio as compared with the regional results for the same year which is 99.36 percent, 99.15 percent and 99.25 percent for male, female and both sexes, respectively.

At regional level, the gross enrollment ratio in primary schools /1-8/ has increased from 43.7 percent in 1995 to 99.15 in 2008 which can be said a dramatic progress.

d. Gross Enrollment Ratio for Grade 9-10

The gross enrollment ratio for lower secondary level is defined as the total number of pupils attending in grades 9-10 during the current school year divided by the total number of children of lower secondary school age (15-16 years).

The Gross Enrollment Ratio (GER) in 2008 for the grades 9-10 is found to be 30.09 for both sexes and 33.96 for male and 27.81 for female in rural central zone of Tigray. Gender bias in favor of male is revealed which is common as the grade level increases the participation of women tends to show a decreasing trend. Difference is also observed in the gross enrollment ratio as compared to the regional results which is 44.76 percent, 40.31 percent and 42.58 percent (see table 4.5 above) for male, female and both sexes, respectively requiring more work by the zone to attain at least regional results.

In 2002, the gross enrollment ratio for lower secondary schools /9-10/ at regional level was only 21.68 percent. Now comparing of gross enrollment ratios for lower secondary school (for the grades 9-10) in Axum town was 172.02 and 162.99 percent for the years 2007 and 2008 respectively showing a 9.03 percent decrease and in Adwa town the gross enrollment ratio was 248.68 and 180.13 percent for the years 2007 and 2008 in that order showing a decease of 68.55 percent. This difference may be, according to the report of the education bureau, attributable to the construction of high schools by the government in nearby to the society. However, it is still

obvious from the data that the schools are getting saturated by newly registering students flowing from rural.

In the new millennium, new lower high school for grade 9-10 is opened in Adwa town by the government and two high schools one in Naedier-adet and the other in Mereb-leke Woreda are up-graded to the preparatory stage i.e. grade 11-12 which could have great contribution in the absorption of students flowing to Adwa and Axum towns.

4.1.5.4 Net Enrollment Ratio

The gross enrollment ratio does not show whether the exact proportion of school age children is currently attending or not attending school. The net enrollment ratio, however, refines the gross enrollment ratio by limiting its domain to school age children. It shows the proportion of school-age children that are currently attending or not attending school out of the total school-age children.

Net enrollment ratio is defined as the number of pupils of primary school age (7 years) and is currently attending primary school divided by the total number of children in that age (7 years).

There exist some discrepancies between data obtained from the regional bureau of education and data obtained from the central zone administration office. The number of students registered for grade 1-4 for example is 138,217 in regional bureau while this number is 158,260 as obtained from the central zone. Similarly the number of students registered for the grades 5-8 is 85,141 in the regional bureau while 89,065 in the specified zone. As a result, the number of students registered for the grades 1-8 is 223,358 according to the data from regional bureau and this is found to be 247,324 in central zone showing a percentage change of 9.67. The reason could be because of lately registered students in the zone after reports have been submitted to regional bureau of education. Having this in mind, the following table obtained from central zone depicts the gross enrollment ratio (GER) and net enrolment ratio (NER) for grade 1 students.

Table 4.6 Net and Gross Enrollment Ratios for Primary School Students (Grade 1)

Woreda	Net enrollment rate (NER)	Gross enrollment rate (GER)
N/ Adet	71.26	123.07
Werie-leke	100	103.26
Q/Temben	70.16	150.73
Ahferom	96	105.7
L/Maychew	73.9	83.95
M/ Leke	89.8	92.28
T/Maychew	89	93.17
G/ Adwa	98.96	113.23
T/Abergele	86	101.05
C/Zone	86.45	109.28

Source: Central Zone Administration Office, 2008

The table above indicated that there exists a wide gap between GER and NER in grade 1 students especially in Qola-temben and Naedier-adet Woredas deserving much hard work to achieve the universal primary school education of the Millennium Development Goals (MDGs) by 2015.

4.1.5.5 School Dropout Rates (SDR)

Using indicators in isolation is misleading. Assessing the recent dropouts together with the enrollment ratios will give a better picture of the current educational problems. A person is considered to be a school dropout if he/she is registered in a formal school just before the survey year and did not appear for the end of the year examination or sat for the final examination but have failed to register during the survey year. Dropout rate is then defined as the proportion of school dropouts out of the total enrolled pupils in the school year just before the survey year.

Table 4.7 below presents the dropout at lower primary level (grade 1-4) and is found to be 5.99, 4.26 and 5.13 for male, female and both sexes, respectively. Findings from the same table shows the dropout rates for the grades 5-8 are 6.80, 4.33 and 5.52 for male, female and both sexes, respectively. In general, the dropout rates for the grades 1-8, are found to be 6.29, 4.29 and 5.29 for male, female and both sexes, respectively. Therefore, the results revealed that the problem of dropout was more serious for boys than for girls in members of cooperatives in rural central zone of Tigray.

The dropout rates in the lower secondary schools (9-10) show similar trend with dropout rates higher for male, i.e. 7.71 for male, 5.69 for female and 6.70 for both sexes. However, it has to be noted that the dropout rates in general are low as compared with the results obtained from DHS survey of 2004 in which Tigray had dropout rate of 17.1 percent. Reasons for dropout are given in the next section.

Table 4.7 SDR by Gender, Level of Schooling, Woreda and Zone Total -2008

Woreda	School Dropout Rates											
	1-4			5-8			1-8			9-10		
	M	F	T	M	F	T	M	F	T	M	F	T
N/ Adet	11.06	7.37	9.20	14.87	6.50	10.69	11.94	7.12	9.53	12.46	8.44	10.45
Werie-leke	3.65	2.75	3.20	5.12	3.83	4.48	4.23	3.21	3.72	6.11	5.57	5.84
Q/Temben	5.77	4.52	5.12	6.63	6.06	6.35	5.99	4.96	5.48	-	-	-
Ahferom	5.12	4.36	4.75	4.52	3.51	4.02	4.86	3.97	4.42	9.98	6.36	8.17
L/Maychew	4.89	3.30	4.10	4.91	2.70	3.81	4.90	3.00	3.95	16.60	7.76	12.18
M/ Leke	8.49	4.95	6.72	11.04	6.62	8.83	9.40	5.59	7.50	12.44	7.45	9.95
T/Maychew	4.40	2.85	3.63	6.35	3.83	5.09	5.21	3.29	4.25	9.72	5.39	7.56
G/ Adwa	2.84	2.20	2.52	4.76	2.75	3.76	3.54	2.43	2.99	-	-	-
T/Abergele	7.31	5.11	6.21	5.56	1.87	3.72	6.75	4.04	5.40	6.82	7.14	6.98
C/Zone	**5.99**	**4.26**	**5.13**	**6.80**	**4.33**	**5.52**	**6.29**	**4.29**	**5.29**	**7.71**	**5.69**	**6.70**

Source: Central Zone Administrative Office, 2008

' – ' designates 'Data not available'.

4.1.5.6 Reasons for Dropouts

Out of the total household members 5 years and above, the percentage of registration in school for the year prior to the survey year was only 32.8 percent of whom 92.8 percent were enrolled in the grades 1-8 where 98.5 percent of them managed to sit the final exam and 98.1 percent promoted to the next level (see table 4.8). Of those 1.5 percent students who did not take the final exam, their main reason for not taking the last exam, who accounted 75 percent, was being involved in other jobs.

Table 4.8: Response regarding school registration last year

		Count	%
Did you register in any school last year?	Yes	264	32.8
	No	540	67.2
Total		804	100.0
If you register at which grade level?	Read & write	7	2.7
	Grade 1 - 4	155	58.7
	Grade 5 - 8	90	34.1
	Grade 9 - 10	10	3.8
	Grade 11 - 12	2	.8
Total		264	100.0
If you register did you take the last exam?	Yes	260	98.5
	No	4	1.5
Total		264	100.0
If you take the last exam, have you promoted?	Yes	255	98.1
	No	5	1.9
Total		260	100.0
If you don't take the last exam, reason for not taking exam?	Involving in other job	3	75.0
	Other	1	25.0
Total		4	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.5.7 Repetition Rate

Table 4.9 below depicts repetition rates by level of schooling and sex for primary school students. Repetition rate for the grades 1-3 in central zone was found to be 1.52, 1.55 and 1.54 for male, female and both sexes, respectively. The results for the grades 4-8 are 2.64, 3.72 and 3.18 for male, female and both sexes, respectively. The repetition rates for the grades 1-8 are found to be 2.08, 2.68 and 2.38 while the results at regional level are 3.31, 3.86 and 3.58 for male, female and both sexes in that order.

It can be concluded from the available data that repetition rates are lower in the zone as compared to the regional results, however, the repetition rate for female is higher with in rural central zone at all grade levels as compared with their male counterparts.

Table 4.9 Repetition Rate for Primary School (Grade 1-8)

Woreda	Grade 1-3			Grade 4-8			Grade 1-8		
	M	F	T	M	F	T	M	F	T
N/ Adet	1.33	1.43	1.37	1.76	3.28	2.55	1.47	2.14	1.80
Werie-leke	1.71	1.73	1.72	3.33	4.28	3.81	2.52	3.07	2.80
Q/Temben	2.33	2.73	2.51	2.18	2.61	2.39	2.27	2.68	2.47
Ahferom	0.95	1.21	1.07	5.03	7.14	6.10	3.25	4.66	3.95
L/Maychew	1.90	1.51	1.72	2.46	3.42	2.98	2.20	2.65	2.43
M/ Leke	0.69	0.74	0.71	1.13	2.03	1.54	0.89	1.34	1.11
T/Maychew	1.21	0.95	1.08	2.01	2.67	2.35	1.62	1.90	1.76
G/ Adwa	1.80	1.53	1.67	2.48	3.92	3.25	2.12	2.81	2.47
T/Abergele	1.77	2.16	1.97	3.39	4.10	3.74	2.39	2.92	2.65
C/Zone	**1.52**	**1.55**	**1.54**	**2.64**	**3.72**	**3.18**	**2.08**	**2.68**	**2.38**
Region	**2.08**	**2.21**	**2.14**	**4.76**	**5.60**	**5.19**	**3.31**	**3.86**	**3.58**

Source: Tigray Education Bureau, 2008

4.1.5.8 Type of School Attended and Basic Problems Faced by Students

According to the survey results, nearly 40 percent of the respondents greater than 5 years of age have registered to learn during the survey year indicating still large number of people out of school (see table 4.10) and the grade level in which they registered in for the grades 1-8 accounted 91.2 percent. Nearly five percent and 0.7 percent of the respondents have registered for the grades 9-10 and 11-12, respectively.

Table 4.10: Response regarding school registration this season

		Count	%
Did you register in any school this season?	Yes	307	39.9
	No	462	60.1
Total		**769**	**100.0**
If you have register at which grade level?	Read & write	10	3.3
	Grade 1 - 4	183	59.6
	Grade 5 - 8	97	31.6
	Grade 9 - 10	15	4.9
	Grade 11 - 12	2	.7
Total		**307**	**100.0**
Type of school you have registered in?	Governmental	306	99.7
	NGO on payment	1	.3
Total		**307**	**100.0**

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Out of those students who had registered in 2008 academic year, 99.7 percent of the respondents had registered in governmental school. The basic problems of the school that the respondents registered in was shortage of books, lack of adequate services, shortage of class and teachers accounted 51.8 percent, 45.9 percent, 41 percent and 31.9 percent, respectively.

Table 4.11: Basic problems of the school that the respondent is registered in.

	Yes		No		Total	
	Count	%	Count	%	Count	%
Shortage of books	159	51.8	148	48.2	307	100.0
Shortage of teachers	98	31.9	209	68.1	307	100.0
Shortage of class rooms	126	41.0	181	59.0	307	100.0
Shortage of services	141	45.9	166	54.1	307	100.0
Other	18	6.0	282	94.0	300	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.5.9 Ratio of Pupil to Section

The ratio of pupil to section for the grades 1-4, 5-8 and 9-10 are 44, 49 and 63, respectively indicating as the grade level increases the ratio of pupil to section also increases. This requires attention to be given to the construction of additional schools in the higher grade levels.

However, no difference is observed in the ratio of pupil to section when compared against the regional ratios of pupil to section which were found to be 44, 49 and 61, respectively.

4.1.5.10 Ratio of Pupil to Teachers

The table below revealed that the ratio of pupil to teachers in central zone for the grades 1-8 and 9-10 was 48.62 and 50.63 while this result for the region is 46.04 and 38.61, for the same grade levels in that order. Comparing pupil to teachers ratio against the regional results for the grades 9-10 (50.63 against 38.61), there exist a difference of 12.02 which could be due to as is shown in the table below the high pupil to teacher ratio in G/Adwa Woreda i.e. 120 requiring immediate intervention.

Table 4.12: Proportion of Pupils with Teachers by Woreda, Zone and Region - 2008

Woreda	Ratio of Pupil to Teachers					
	1-8	Number of Teachers	Ratio	9-10	Number of Teachers	Ratio
N/ Adet	19,742	439	45	1005	28	36
Werie-leke	34,170	644	53	4032	65	62
Q/Temben	26,580	548	49	349	16	22
Ahferom	40,784	759	54	4043	80	51
L/Maychew	18,279	369	50	893	21	43
M/ Leke	19,245	475	41	1639	37	44
T/Maychew	22,610	499	45	2063	33	63
G/ Adwa	26,591	464	57	**240**	**2**	**120**
T/Abergele	15,357	397	39	469	9	52
C/Zone	**223,358**	**4594**	**48.62**	**14,733**	**291**	**50.63**
Region	**928,692**	**20,171**	**46.04**	**84,052**	**2177**	**38.61**

Source: Tigray Education Bureau, 2008

4.1.6 Health (For all HH members)

4.1.6.1 Prevalence of Illness (Illness Episode)

The prevalence of illness in this survey is based on a two months reference period and refers to an episode of any health problem (self-reported) that members of the households came across during the two months period prior to the date of interview. Of the total population covered in the survey, only 9.6 percent members of cooperatives reported that they had health problems at least once over the two months period prior to the date of interview.

4.1.6.2 Prevalence of Major Diseases

This section presents the prevalence of major and easily recognizable diseases and injury that the sampled population under study reported. All members were asked whether they had been ill of specified diseases and/or injured over the 2 months prior to the date interview.

As shown in table 4.13, the most prevalent illness or disease is found to be malaria (28.4 percent), followed by diarrhea (14.8 percent). The category "others" constitutes all other diseases which could not be easily identified and has significant proportion (26.1 percent). Diseases related to above the neck (ear, nose & throat) and Tuberculosis accounted 9 and nearly 8 percent, respectively.

The over all comparison of the prevalence rates by gender has shown an upper bias among female for malaria (56 percent), diarrhea (53.8 percent), ophthalmic problem (60 percent), disease related to ear, nose and throat (87.5 percent) and injury (100 percent). Prevalence of dental and dermis problems is found to be the same among male and female. The disease tuberculosis is more prevalent among male (85.7 percent) than female (14.3 percent).

Results obtained from DHS of 2004 indicate similar situation in the prevalence of major diseases in Tigray, malaria being the highest (20 percent) followed by diarrhea (12.6 percent).

Table 4.13: Response regarding facing sickness and/or accident & its type

		Sex				Total	
		Male		Female			
		Count	Percent	Count	Percent	Count	Percent
did you face sickness and/or accident during the 2 months?	Yes	39	44.3%	49	55.7%	88	100.0%
	No	429	51.6%	402	48.4%	831	100.0%
Total		468	50.9%	451	49.1%	919	100.0%
If yes, type of disease	Malaria	11	44.0%	14	56.0%	25	100.0%
	Diarrhea	6	46.2%	7	53.8%	13	100.0%
	Accident	0	.0%	1	100.0%	1	100.0%
	Dental problem	1	50.0%	1	50.0%	2	100.0%
	Ophthalmic problem	2	40.0%	3	60.0%	5	100.0%
	Dermis problem	2	50.0%	2	50.0%	4	100.0%
	Disease related to ear/nose/throat	1	12.5%	7	87.5%	8	100.0%
	Tuberculosis	6	85.7%	1	14.3%	7	100.0%
	Other	10	43.5%	13	56.5%	23	100.0%
Total		39	44.3%	49	55.7%	88	100.0%

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

The number of days separated from main job due to sickness of malaria is 0-5 days and 6-15 days accounting 52 percent and 40 percent, respectively of those who responded were sick of the disease. The number of respondents who were separated from their main job for 0-5 days and 6-15 days due to sickness of diarrhea accounted 61.5 percent and 30.8 percent, respectively (see table 4.14).

It is, nevertheless, worthwhile to note that as the irruption of malaria is seasonal these findings might vary over the 12 months of the year.

4.1.6.3 Incidence of Health Service Consultation

Members of cooperative, whether they have been sick or not, were also asked whether they visited any health institution during the last two months or not. Individuals are expected to consult for medical assistance either from modern health institution or from traditional healers to check their health status.

The survey result showed that only 6.8 percent of the population had consulted for treatment (see table 4.15).

Table 4.14: Number of days separated from main job due to the sickness/accident by type of disease

	0 - 5		6 - 15		16 - 30		>30		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
Malaria	13	52.0	10	40.0	1	4.0	1	4.0	25	100.0
Diarrhea	8	61.5	4	30.8	1	7.7	0	.0	13	100.0
Accident	0	.0	1	100.0	0	.0	0	.0	1	100.0
Dental problem	2	100.0	0	.0	0	.0	0	.0	2	100.0
Ophthalmic problem	3	60.0	2	40.0	0	.0	0	.0	5	100.0
Dermis problem	2	50.0	1	25.0	1	25.0	0	.0	4	100.0
Disease related to ear/nose/throat	4	50.0	2	25.0	1	12.5	1	12.5	8	100.0
Tuberculosis	2	25.0	4	50.0	2	25.0	0	.0	8	100.0
Other	12	50.0	8	33.3	4	16.7	0	.0	24	100.0
Total	46	51.1	32	35.6	10	11.1	2	2.2	90	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Of those who had consulted health institution (6.8 percent), the type of institution being consulted was government health post, nucleus health center and hospital accounting 42.2 percent, 31.3 percent and 18.8 percent respectively. Traditional institution consulted had 1 percent indicating the increasing level of awareness in the utilization of modern health institutions by members of cooperatives in the study area.

Table 4.15: Response regarding health service

		Count	%
Did you get a medication service by visiting health personnels. (either modern or traditional)	Yes	64	6.8
	No	873	93.2
Total		937	100.0
Type of health institution	Traditional	1	1.6
	Gov't hospital	12	18.8
	Gov't health center	20	31.3
	Gov't clinic	2	3.1
	Gov't health post	27	42.2
	Private institution	2	3.1
Total		64	100.0
Did you encounter any problem in the health institution	Yes	14	21.9
	No	50	78.1
Total		64	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.6.4 Types of Problems Observed in Health Institutions Visited

Individuals who had consulted for health assistance during the two months prior to the date of interview were further asked to indicate the type of problem they observed at the health institutions visited.

The survey indicated that 85.7 percent of the total respondents who had consulted for medical assistance reported that the main problem they faced is shortage of drugs. Shortage of health personnel is reported by 64.3 percent of the respondents followed by shortage of equipments & expensive health service 35.7 percent each. Long waiting time and lack of laboratory accounted 21.4 percent each and 28.6 percent of the respondents reported sanitation problem. Furthermore, a considerable proportion of the respondents (14.3 percent) have also reported that staff is not cooperative (see table 4.16 and Figure 4.2 below).

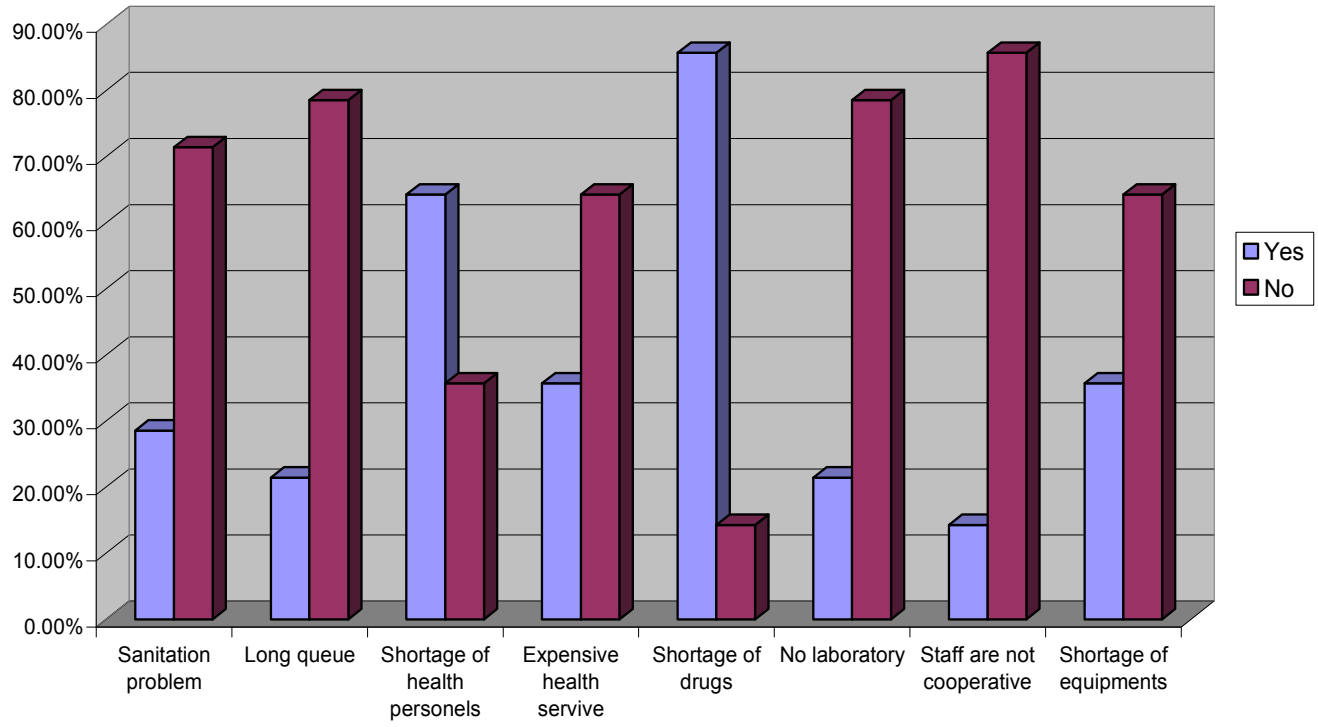
The survey findings are unanimously in agreement with the 2004 DHS results that “unavailability of drugs” was the most serious problem reported in Tigray (22.9 percent).

Table 4.16: Problems in the health institutions

Type of problems	Yes		No		Total	
	Count	%	Count	%	Count	%
Sanitation problem	4	28.6	10	71.4	14	100.0
Long queue	3	21.4	11	78.6	14	100.0
Shortage of health personels	9	64.3	5	35.7	14	100.0
Expensive health servive	5	35.7	9	64.3	14	100.0
Shortage of drugs	12	85.7	2	14.3	14	100.0
No laboratory	3	21.4	11	78.6	14	100.0
Staff are not cooperative	2	14.3	12	85.7	14	100.0
Shortage of equipments	5	35.7	9	64.3	14	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.2 Responses on Problems in Health Institutions



4.1.6.5 Prenatal Care (PNC)

Improving maternal health is one of the objectives set in the MDGs. Maternal health care includes the care a mother receives during pregnancy, during delivery and in the postnatal period. Regular Prenatal Care (PNC) mitigates those complications of pregnancy and delivery that may jeopardize mother's and infants' chances of survival. Thus, adequate care before, during and after child birth is crucial in reducing the risks of infant mortality and maternal mortality and hence for promoting maternal and infant health (Source: CSA).

In this study, questions were forwarded to women who were pregnant during the 12 months prior to the date of interview. Table 4.17 presents distribution of women that received prenatal care. The data revealed that out of the total pregnant women aged 15 years and above, 76.5 percent had received prenatal care.

Table 4.17: Response of female respondents of age 15 years & above regarding pregnancy & pre-natal care.

		Count	%
Was there pregnancy and/or birth during the last 12 months	Yes	17	7.6
	No	206	92.4
Total		223	100.0
If yes, did you receive pre-natal care during pregnancy	Yes	13	76.5
	No	4	23.5
Total		17	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.7 Nutritional Status and Child Care

Children suffering from malnutrition deserve serious attention not only for keeping them in good health but also on the account that the future world will be in vain with out them. The prevalence of malnutrition in Tigray is high and data on nutritional status of children will benefit to data users. Nutritional indices in the case of children are sensitive indicators and signal serious problems that might require an immediate reaction.

The study has provided data on the anthropometric measurements for children aged 3-59 months that are used to calculate nutritional indices. Accordingly, three nutritional indices, namely, weight-for-height, height-for-age, weight-for-age are computed from the data. Nutritional status of the children is then determined by comparing the observed measurements with the

anthropometric standards of the reference population developed by the United States National Center for Health Statistics and US Center for Disease Control (NCHS/CDS). The analysis is based on the standardized measurements (Z-scores) depending on the cut-off set up to -2 standard deviations (-2Std. Dev.). A child is identified as wasted, stunted or under weight if his/her weight-for-height, height-for-age, weight-for-age z-score is -2Std. Dev or less. Information on child immunizations, delivery places, etc. are also included in this section.

4.1.7.1 Weight-for-height (Wasting)

Weight-for-height is an age-independent nutritional status indicator of acute malnutrition or wasting based on the principle that a child of a certain height has an expected weight. Wasting, a condition of low weight-for-height, is a reflection of recent malnutrition in a population which may be caused by acute food shortage or serious infections. For the purpose of analysis a child is considered wasted, if his/her weight-for-height Z-score is -2 standard deviations or less.

According to the findings of the survey, the prevalence of wasting in the rural central zone is found to be 11.3 percent (see table 4.18 and figure 4.3). Results of DHS in 2004 indicated that the prevalence rate of wasting for rural Tigray was 12.8 percent.

Prevalence of wasting by gender suggests a possibility of bias with girls suffering higher degree of acute malnutrition than boys. Prevalence of wasting for girls is higher by about 5.5 percent than boys. The results of the survey in relation to age of a child revealed that the prevalence of wasting consistently shows a decreasing trend as the age of child increases. The prevalence of wasting is lower for children of age three years and over and is highest for children aged 3 months to 11 months.

Table 4.18 Prevalence of low weight-for-height (wasting) by sex and age group

Age Group (months)	Sex	Number below cut-off (-2 SD)	Number in age group	Percentage below cut-off
3 - 11	Boys	1	6	16.67
	Girls	2	8	25.00
	Combined	3	14	21.43
12 - 23	Boys	1	8	12.50
	Girls	3	19	15.79
	Combined	4	27	14.81
24 - 35	Boys	1	13	7.69
	Girls	2	16	12.50
	Combined	3	29	10.34
36 - 59	Boys	1	23	4.35
	Girls	3	31	9.68
	Combined	4	54	7.41
Total	Boys	4	50	8.00
	Girls	10	74	13.51
	Combined	14	124	11.29

Source: Own survey, 2008

4.1.7.2 Height-for-age (Stunting)

Height-for-age is a nutritional status indicator of chronic malnutrition or stunting based on the principle that a child has an expected height for his/her age. It is an indicator of long-term or accumulated nutritional deficiency resulting from lack of adequate dietary intake over a long period of time or recurrent illness. In this analysis, a child is identified as stunted if his/her height-for-age z-score is less than -2 standard deviations or less from the reference population.

According to the survey results, 46 percent of the total children aged 3 to 59 months in rural part of central zone suffer from chronic malnutrition. Reports on DHS show that malnutrition in rural Tigray as of 2004 was nearly 48 percent.

Distribution of stunted children by gender suggests that at rural central zone level male children are more vulnerable to long-term malnutrition than female children. The prevalence at zone level is 58 percent among boys and 37.84 percent among girls (see table 4.19)

The prevalence of stunting by age and gender (see table 4.19) reveals that prevalence of stunting is highest for boys at age group 12 to 23 months and for girls at age group 36 to 59 months while the lowest stunting was observed at age group 3 to 11 months for both boys and girls which could likely be due to breastfeeding practices during infancy.

Table 4.19 Prevalence of low height-for-age (stunting) by sex and age group

Age Group (months)	Sex	Number below cut-off (-2 SD)	Number in age group	Percentage below cut-off
3 - 11	Boys	3	6	50.00
	Girls	1	8	12.50
	Combined	4	14	28.57
12 - 23	Boys	6	8	75.00
	Girls	7	19	36.84
	Combined	13	27	48.15
24 - 35	Boys	8	13	61.54
	Girls	6	16	37.50
	Combined	14	29	48.28
36 - 59	Boys	12	23	52.17
	Girls	14	31	45.16
	Combined	26	54	48.15
Total	Boys	29	50	58.00
	Girls	28	74	37.84
	Combined	57	124	45.97

Source: Own survey, 2008

4.1.7.3 Weight-for-age (Under Weight)

Weight-for-age is a nutritional status indicator of malnutrition (either acute or chronic malnutrition) based on the principle that a child has an expected weight for his/her age. Weight-for-age index measures the general nutritional status of children. It is a nutritional deficiency caused by recent and past malnutrition.

The findings of the survey revealed a prevalence rate of 38.71 percent in rural central zone of Tigray. More than two out of five children in Tigray were observed to be underweight in 2004 DHS.

The level of under weight and gender of a child shows gender bias. The prevalence of underweight is higher among boys (40 percent) than girls (37.84 percent).

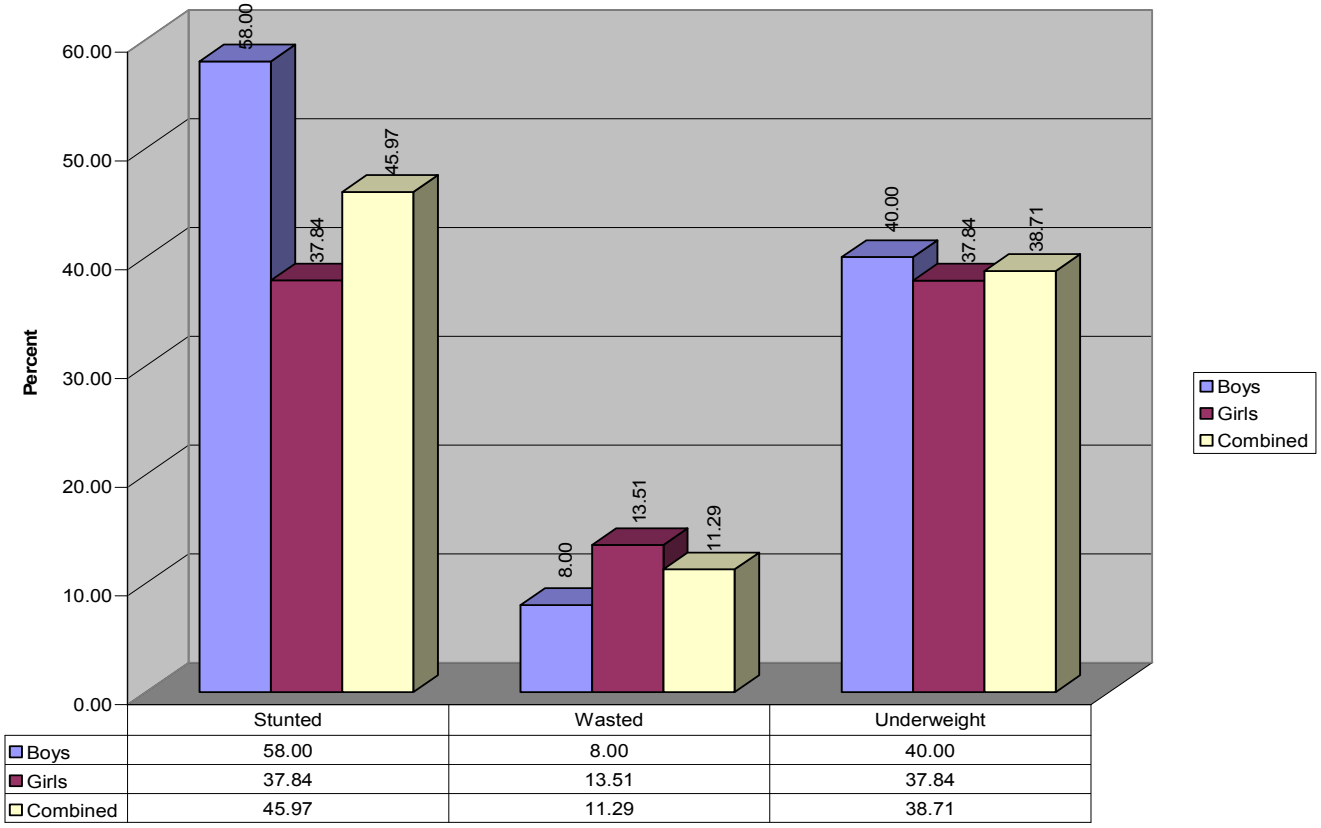
Distribution of malnourished children by age (see table 4.20) exhibits that prevalence of underweight is lowest among younger children (3-5 months) for both sexes and highest among children between 12 and 23 months old for boys and 12 months to 35 months for girls. The proportion of low weight-for-age declines as the age of the child increases for boys after reaching its climax in the age group 12-23 months.

Table 4.20 Prevalence of low weight-for-age (underweight) by sex and age group

Age Group (months)	Sex	Number below cut-off (-2 SD)	Number in age group	Percentage below cut-off
3 - 11	Boys	2	6	33.33
	Girls	1	8	12.50
	Combined	3	14	21.43
12 - 23	Boys	5	8	62.50
	Girls	8	19	42.11
	Combined	13	27	48.15
24 - 35	Boys	7	13	53.85
	Girls	7	16	43.75
	Combined	14	29	48.28
36 - 59	Boys	6	23	26.09
	Girls	12	31	38.71
	Combined	18	54	33.33
Total	Boys	20	50	40.00
	Girls	28	74	37.84
	Combined	48	124	38.71

Source: Own survey, 2008

Figure 4.3 Distribution of Malnutrition in Children Aged 3-59 Months



	Stunted	Wasted	Underweight
Boys	58.00	8.00	40.00
Girls	37.84	13.51	37.84
Combined	45.97	11.29	38.71

4.1.7.4 Place of Delivery and Attendance

Information on place of delivery for children under-five years of age was collected. Delivery in modern health service institutions reduces the incidence of maternal and infant mortality rates. The distribution of under-five children by place of delivery during the five years period is presented in the table below.

The survey data shows that 97.4 percent of children were delivered at home. Rural children in central zone delivered in health institution constitute only 2.6 percent where it is still unlikely for rural children to be born in health institutions. The DHS results for 2004 show that 96.5 percent of children in rural Tigray were delivered at home.

Assistance during delivery has strong health implication on mothers and children. Delivery outside health institutions in most cases is not assisted by trained personnel. The distribution of children by type of attendant assisting during delivery is presented below.

The majority of children under five years of age (72.2 percent) were born assisted by untrained traditional birth attendant (TBA) while16.5 percent of under five were delivered without assistant indicating that self-assistance during delivery is still experienced by significant proportion of women. 9.6 percent of under-five were attended during delivery by trained traditional birth attendant (TTBA) and only 1.7 percent were assisted by professional health person during delivery. The results of DHS for 2004 show that 86.9 percent of under five children were born assisted by untrained traditional birth attendant (TBA).

Table 4.21: Response regarding childbirth and health of under 5 years of age children.

		Count	%
Place of birth	Hospital	3	2.6
	Residence	112	97.4
Total		**115**	**100.0**
Assistant while childbirth	Professional health person	2	1.7
	Trained traditional midwife	11	9.6
	Untrained traditional midwife	83	72.2
	Without assistant	19	16.5
Total		**115**	**100.0**
Is the vaccination card currently available	Available	102	88.7
	Lost	7	6.1
	Not available	6	5.2
Total		**115**	**100.0**

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.7.5 Child Immunization

Universal Immunization of Children which deals with vaccine-preventable diseases, namely, Tuberculosis, Diphtheria, Polio and Measles plays a great role in mitigating infant and child mortality rates.

In this study, households were asked whether or not their children aged 0-59 months, if any, had ever been immunized against measles, BCG, DPT, and Polio.

Information on vaccination coverage was collected in two ways, from vaccination cards or from mothers. Vaccination coverage in central zone is found to be high and this coverage pertains to any type of the different levels (i.e. DPT 1-3 and Polio 0-3 and campaign). According to the results, out of the total children under-five years of age 94.8 percent were vaccinated against measles and 96.5 percent against BCG and DPT each and finally vaccination against polio stood at 95.7 percent. Data on number of times that a child under-five years of age has taken Vitamin 'A' so far have also been collected. The findings showed that a child in rural central zone has taken vitamin 'A' at least once and at most 9 times over the last five years prior to the survey period (see tables 4.22 and 4.23).

Table 4.22: Response regarding child vaccination on certain types of disease

	Vaccinated		Not vaccinated		Total	
	Count	%	Count	%	Count	%
Measles	109	94.8	6	5.2	115	100.0
BCG	111	96.5	4	3.5	115	100.0
DPT	111	96.5	4	3.5	115	100.0
Polio	110	95.7	5	4.3	115	100.0

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.23: Number of times that the child under 5 yrs. of age has taken vitamin 'A' so far.

Maximum	9
Mean	3.61
Minimum	1
Range	8
Standard Error of Mean	.16
Std Deviation	1.76

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted

4.1.7.6 Prevalence of Diarrhea, Fever and Cough

Dehydration due to diarrhea is one of the major causes of morbidity and mortality among children under five years of age. Studies show that infant mortality and child malnutrition are highly associated with diarrhea.

Information on diarrhea, fever and cough episode during the two weeks prior to the survey date pertaining to children under five years of age was collected from mothers. The table below presents the results of the study on prevalence of diarrhea, fever and cough in children of members of cooperatives in rural central zone of Tigray. Accordingly, the prevalence of diarrhea, fever and cough among children aged 0-59 months stands at 9.6 percent, 3.5 percent and 8.8 percent, respectively. This rate is much lower than the regional result obtained from DHS in 2004 which were 16 percent, 19.5 percent and 23 percent in the same order reflecting possibly improving conditions of health and sanitation over time.

Table 4.24: Type of disease the child has suffered during the last 2 weeks.

	Yes		No		Total	
	Count	%	Count	%	Count	%
Diarrhea	11	9.6%	103	90.4%	114	100.0%
Fever	4	3.5%	110	96.5%	114	100.0%
Cough	10	8.8%	104	91.2%	114	100.0%

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.1.7.7 Diarrhea treatment

In this study sample households were also asked how they treated their children who had diarrhea. Treatment for dehydration usually is Clinical Oral Rehydration Salts known as ORS, home made ORS solutions and other liquids. As is shown in the table below, out of the total children who had diarrhea during the two weeks prior to the survey date, the overwhelming majority 63.6 percent were given clinical ORS while 18.2 percent given home made ORS and the same percentage of children were not given any treatment. Children who had not received diarrhea treatment in Tigray in 2004 were 45.8 percent showing a percentage change of 27.6 obviously improving conditions of health and sanitation.

Table 4.25: Measures taken for the child suffered of diarrhea

	Count	Percent
Provide O.R.S.	7	63.6%
Provide house made O.R.S.	2	18.2%
No measure taken.	2	18.2%
Total	11	100.0%

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2 Household's Living Standard

To achieve the third objective of the study, the standard of living of the households has been evaluated. The findings of the survey are provided below.

4.2.1 Housing, Status of Housing Facilities and Tenure

4.2.1.1 Tenancy Status

Households were asked for how many years they resided in the housing unit they are living during the survey period. The average number of years the households resided in the household they are currently living was found to be 23 years where 88.4 percent of them had lived in the housing unit for at least 10 years (see tables 4.26 and 4.27 below).

Table 4.26: Total period (in years) when the household has resided in this dwelling unit.

Minimum	.00
Mean	23.33
Maximum	55.00
Range	55.00
Std Deviation	12.50
Standard Error of Mean	.95

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.27: Total period (in years) when the household has resided in this dwelling unit

	Count	Percent
0.5 - 5.0 years	8	4.7%
5.1 - 10.0 years	12	7.0%
10.1 - 20.0 years	56	32.6%
20.1 - 30.0 years	49	28.5%
> 30.0 years	47	27.3%
Total	172	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

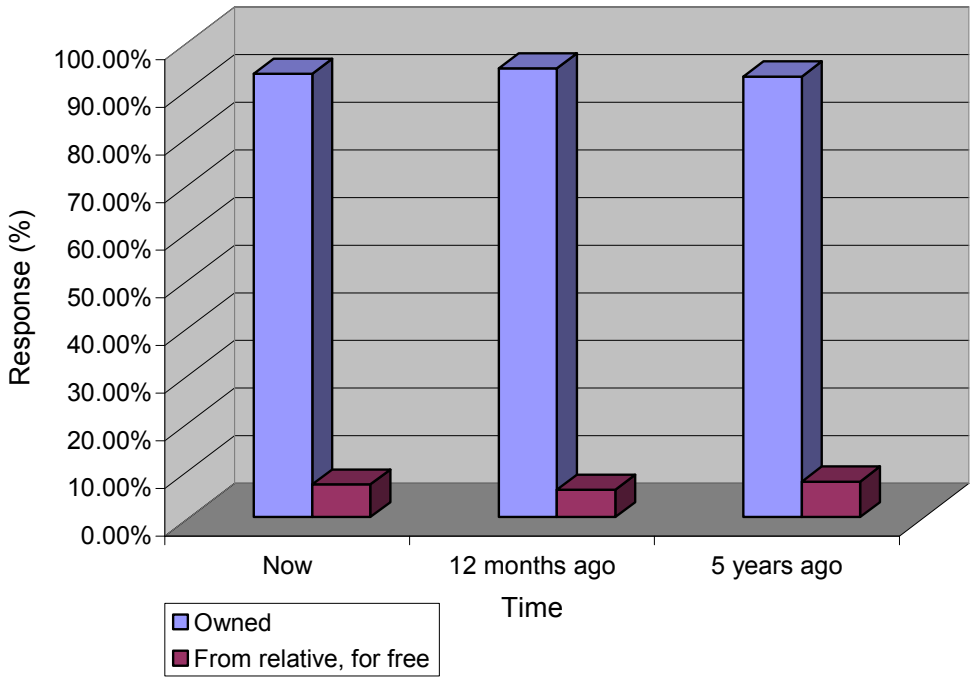
Table 4.28 and Figure 4.4 depicts that nearly 93 percent of the total households of members of cooperatives in rural central zone live in their own houses and 7 percent live in rented or rent free houses during the survey period. No significant difference is observed over the last 5 years and a year ago as compared to the survey period on the type of ownership of a housing unit.

Table 4.28: Type of ownership of the dwelling unit.

	Now		12 months ago		5 years ago	
	Count	**Col %**	**Count**	**Col %**	**Count**	**Col %**
Owned	162	93.1%	164	94.3%	161	92.5%
From relative, for free	12	6.9%	10	5.7%	13	7.5%
Total	174	100.0%	174	100.0%	174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.4 Type of Ownership of the dwelling unit



4.2.1.2 Quality of Dwelling House

a. Number of Rooms

In this survey, according to the definition of CSA, a room is defined as a space enclosed by walls reaching from the floor to the ceiling or roof at least to a height of two meters and having an area of at least four square meters. Excepting for toilets and passage ways and kitchen are considered as rooms. Information on the number of rooms is intended to highlight on how densely or sparsely household members use the rooms in their dwelling.

The table below depicts that, 34.3 percent of the total households reside in two room houses and 32 percent of the total households live in dwelling units that have three rooms. One out of five of the total households also live in houses that have 4 rooms. It can be observed from table 4.29 that 92.3 percent of the total households of members of cooperatives in rural central zone live in houses that have at least two rooms. The total numbers of households that live in single room houses account nearly 8 percent while those households living in houses having 5 rooms account nearly 5 percent.

Table 4.29: Number of rooms and main construction material.

		Count	Percent
Number of rooms excluding kitchen & toilet.	1 room	13	7.7%
	2 rooms	58	34.3%
	3 rooms	54	32.0%
	4 rooms	36	21.3%
	5 rooms	8	4.7%
Total		169	100.0%
Main construction material of the wall	Wood & mud	2	1.1%
	Wood & grass	7	4.0%
	Mud & stone	165	94.8%
Total		174	100.0%
Main type of ceiling	Corrugated iron sheets	28	16.1%
	Thatch & grass	24	13.8%
	Wood & mud	122	70.1%
Total		174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

b. Construction material of wall

Information from the table above indicates that households living in housing units with walls constructed of stone and mud constitute 94.8 percent and dwelling units with wall constructed of wood and grass and of wood and mud accounted only 4 percent and 1.1 percent respectively.

c. Construction material of roof

The survey results indicated that the predominant roofing materials in rural areas of central zone members of cooperatives are wood and mud with 70.1 percent and now a days corrugated iron sheets is also becoming common roofing material in rural areas of the zone which accounted 16.1 percent. Thatch and grass roofed houses are also common accounting 13.8 percent of the total households.

4.2.2 Source of Energy for Lighting and for cooking

The findings presented below in the table show that all of the households (100%) use kerosene for lighting a year ago and now the same source as they were using 5 years before the survey period which is by and large a reflection of rural phenomena.

The use of modern fuel for cooking or the use of traditional energy depends on the availability of these facilities and capacity of the households. All of the rural households in the survey area use collected fire wood for cooking. The data indicated that no household was reported to use other source of energy for cooking during the survey year, one year before and 5 years prior to the survey period. Households are still using traditional fuel and have not experienced any change in the type of fuel used for cooking.

Table 4.30: Type of light used & source of energy for cooking

		Now		12 months ago		5 years ago	
		Count	Percent	Count	Percent	Count	Percent
Type of light used	Kuras/Fanos	174	100.0%	173	100.0%	174	100.0%
Total		174	100.0%	173	100.0%	174	100.0%
Source of energy for	Collected firewood	171	100.0%	169	100.0%	171	100.0%
Total		171	100.0%	169	100.0%	171	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.3 Source of Drinking Water

Table 4.31and pie chart 4.5 below showed that more than half of the total households use public tap water and 35.6 percent of the households in the survey area use rivers and lakes as sources of drinking water. Households that have reported protected well/spring as their source of drinking water constitute 9.2 percent. The survey also reveals that a very negligible proportion of households (0.6 percent) have reported to use their own tap as source of drinking water. About 2.9 percent are also found to have reported unprotected well or spring as their source of drinking water. It can be concluded from the available data that 61.5 percent of the total households in the survey area have access to safe drinking water.

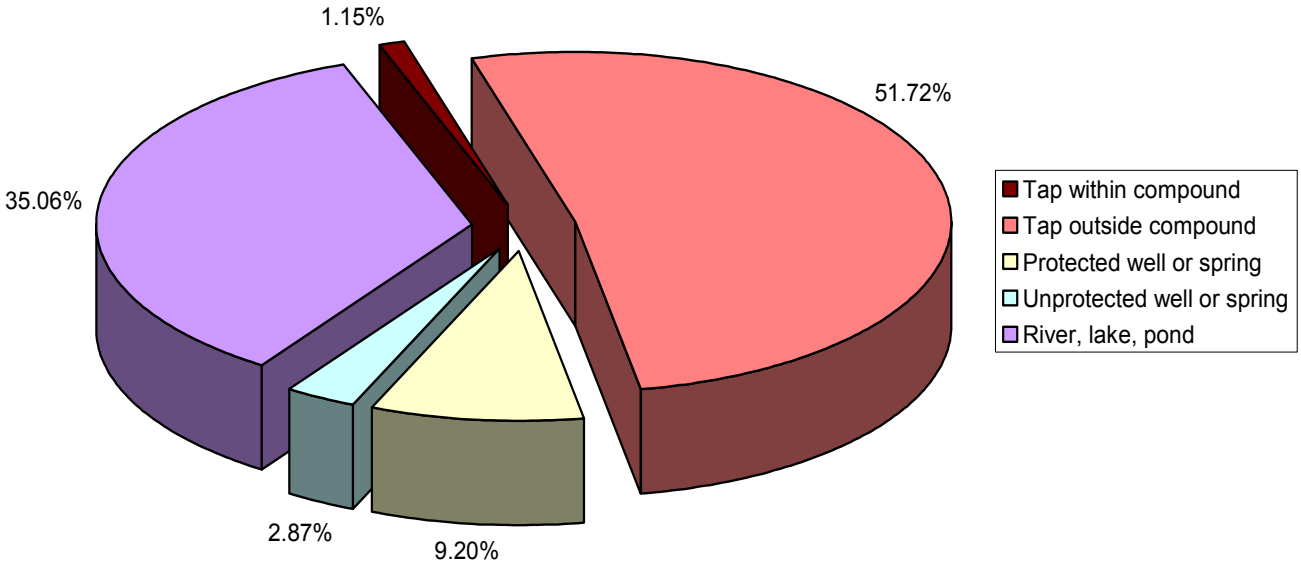
Comparing the condition of water use just before five years and the survey time, no improvement was observed from using public tap to own tap. The percentage of households using public tap has improved from 27 percent to 48.9 percent and to 51.7 percent 5 years before the survey period, a year before the survey period and now, respectively. Similarly, the percentage of households using rivers or lakes has shown a decreasing trend over the last 5 years from 63.8 percent to 38.5 percent and to 35.6 percent in that order. The exhibition of decreasing trend in proportions of households exposed to unsafe water could possibly a reflection of the government's work on it. No significant difference was observed in source of drinking water during rainy and dry seasons.

Table 4.31: Source of drinking water in rainy and dry seasons by period.

		Period					
		Now		12 months ago		5 years ago	
		Count	%	Count	%	Count	%
Source of drinking water in rainy season	Tap within compound	1	.6%	1	.6%	1	.6%
	Tap outside compound	90	51.7%	85	48.9%	47	27.0%
	Protected well or spring	16	9.2%	16	9.2%	7	4.0%
	Unprotected well or spring	5	2.9%	5	2.9%	8	4.6%
	River, lake, pond	62	35.6%	67	38.5%	111	63.8%
Total		174	100.0%	174	100.0%	174	100.0%
Source of drinking water in dry season	Tap within compound	2	1.1%	2	1.1%	2	1.1%
	Tap outside compound	90	51.7%	85	48.9%	45	25.9%
	Protected well or spring	16	9.2%	16	9.2%	5	2.9%
	Unprotected well or spring	5	2.9%	5	2.9%	8	4.6%
	River, lake, pond	61	35.1%	66	37.9%	114	65.5%
Total		174	100.0%	174	100.0%	174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.5 Source of drinking water in dry season



4.2.4 Toilet Facility

Availability of toilet facilities for households helps in lessening the spread of disease associated with poor sanitation. The data collected enables to assess the extent of availability of toilet facilities as well as identification of the types of toilet the households use.

It can be observed from table 4.32 and Figure 4.6 that the majority of the households (61.5 percent) have the opportunity to use private pit latrine. Pit latrine shared is rarely available with only 1.7 percent. About 36.2 percent of the households of members of cooperatives do not have toilet facilities and hence use open field. There is a significant improvement towards acquiring toilet facilities over the past 5 years. The proportion of households that use pit latrine rises consistently from 12.6 percent to 50.6 percent and to 61.5 percent 5 years ago prior to the survey period, a year ago prior to the survey and now, respectively. Similarly, the proportion of households that use field has decreased from 81 percent to 47.7 percent and to 36.2 percent in the same order. This indicated the increasing level of awareness of the households on the merits of sanitation.

4.2.5 Waste Disposal

Table 4.32 below displays on how households dispose their waste in the study area and the overwhelming majority of the households (82.2 percent) stated that they use their waste as fertilizer indicating that using garbage as manure is very common in the study area. Only 12.6 percent of the total households stated that they dispose their waste by just throwing it away. Small proportion of the households (5.2 percent) reported to have the practice of dug-out to dispose the waste and no practice of burning the waste was reported.

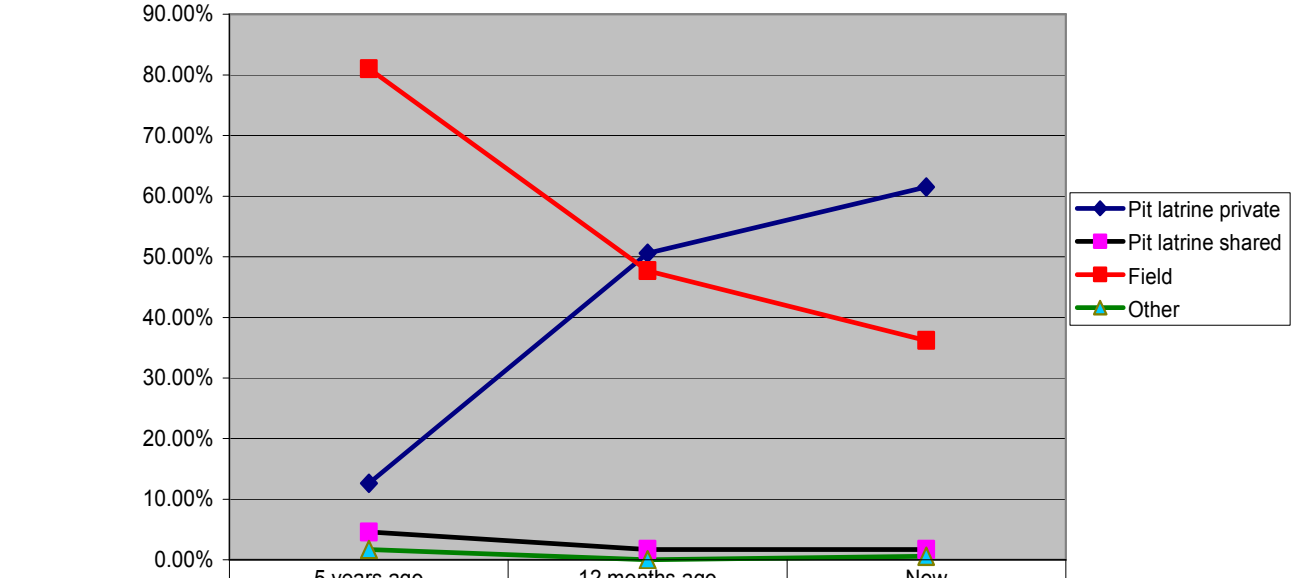
The data revealed that there is a significant improvement on waste disposal methods over the last five years prior to the survey period. Using waste as fertilizer by the households in the survey area increased from 23.6 percent to 72.4 percent and to 82.2 percent with in 5 years prior to the survey, a year ago and now, respectively. Similarly, the practice of disposing waste by throwing away decreased from 70.7 percent to 20.7 percent to 12.6 percent in that order.

Table 4.32: Response regarding sanitation by period

		Period					
		Now		12 months ago		5 years ago	
		Count	%	Count	%	Count	%
Habit of using boiled water for drinking	Yes	4	2.3%	4	2.3%	2	1.1%
	No	170	97.7%	170	97.7%	172	98.9%
Total		174	100.0%	174	100.0%	174	100.0%
Main type of toilet used	Pit latrine private	107	61.5%	88	50.6%	22	12.6%
	Pit latrine shared	3	1.7%	3	1.7%	8	4.6%
	Field	63	36.2%	83	47.7%	141	81.0%
	Other	1	.6%	0	.0%	3	1.7%
Total		174	100.0%	174	100.0%	174	100.0%
Type of waste disposing method used	dug-out	9	5.2%	12	6.9%	8	4.6%
	Throw away	22	12.6%	36	20.7%	123	70.7%
	Use as fertilizer	143	82.2%	126	72.4%	41	23.6%
	Burning the waste	0	.0%	0	.0%	2	1.1%
Total		174	100.0%	174	100.0%	174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.6 Trends in Sanitation by Period



	5 years ago	12 months ago	Now
Pit latrine private	12.64%	50.57%	61.49%
Pit latrine shared	4.60%	1.72%	1.72%
Field	81.03%	47.70%	36.21%
Other	1.72%	0%	0.57%

4.2.6 Accessibility and Utilization of Selected Basic Facilities/Services

4.2.6.1 Access to Selected Basic Services

Sample households were requested to report the distance in kilometers and/or in hours to the nearest facility on the basis of the distance from the physical location of the institution to the households whether they use it or not. It is worth mentioning that information obtained on distance in kilometers might not be the exact distance and at times depends on the subjective judgment of the respondents. The conversion of distance in kilometers to time was made based on the assumption that an adult person could walk a distance of six kilometers per hour. The distribution of households by time taken to reach these facilities is described below (refer to table 4.33).

a. Source of Drinking Water

The average time required to reach the nearest source of drinking water is found to be nearly 25 minutes in both dry and rainy seasons.

b. Food Market

According to the findings of this survey, food markets are on average available at a distance of two hours and a half for the households of members of cooperatives.

c. Telephone Services

According to the results obtained from this survey the average time required to travel by households of the survey area to reach telephone service centers is 1 hours and 10 minutes.

d. Postal Services

According to the results of this survey, the average time required to reach the nearest postal service unit is found to be 5 hours and 10 minutes.

e. All Weather Road

Excluding the community roads, the road density of the region is estimated to be 0.41 km/1000 people or 53 km/1000 square km.

The inquiry made to households on the number of hours they need to travel to reach the nearest all weather road indicates nearly 2 hours.

f. Transport Services

Households of members of cooperatives are required to travel on average for 3 hours and 10 minutes in accessing public transportation services.

g. Veterinary Service

Rural households in central zone of Tigray need to travel on average for one hour and 30 minutes to get veterinary service.

h. Agricultural Inputs

The inquiry made to households on how far they need to travel to reach the nearest suppliers of agricultural inputs (fertilizer provider, improved seed providers, and pest/insecticide suppliers) shows that rural households of members of cooperatives in central zone on average still need to travel for 3 hours.

i. Microfinance

Rural households of members of cooperatives are required to travel on average for 3 hours to reach the nearest microfinance services provider.

j. Firewood

Rural households mostly use collected firewood. The findings revealed that rural households in central zone on average need to go only for 50 minutes.

k. Milling Services

Availability of milling service facility is much better in the study area requiring a travel of at most 40 minutes.

l. Primary and Secondary Schools

The result on table 4.33 below shows that rural households in central zone on average need to travel at most for 50 minutes to access primary school while for secondary school they still need to travel for four hours.

m. Health Services

According to the survey results, households of members of cooperatives in rural central zone are required to travel on average for 1hour, for 3 hours and 40 minutes, for more than 6 hours and for about 7 hours to get health post, health center, clinics and hospital services, respectively.

n. Cooperative Office

The survey results show that members of cooperatives need to travel on average for 1 hour to reach their office.

Table 4.33: Time taken (in hrs.) to reach the service giving institutions

	Mean	Minimum	Maximum	Std Deviation	Standard Error of Mean
Primary school	.8	.1	2.5	.5	.04
Secondary school	4.0	.8	10.0	2.2	.17
Health post	1.0	.2	2.5	.5	.04
Nucleus health center	6.2	1.0	10.0	2.9	.28
Health center	3.6	.5	9.5	2.0	.15
Hospital	6.7	.3	10.0	2.5	.19
Prenatal/postnatal care	1.8	.2	5.0	1.1	.09
Telecommunication	1.2	.1	9.5	1.5	.11
Postal service	5.2	.3	10.0	2.8	.22
Public transport	3.2	.3	9.5	2.2	.16
Grind mills	.6	.1	3.0	.5	.03
Drinking water (dry season)	.4	.1	3.0	.3	.02
Drinking water (rainy season)	.4	.1	3.0	.3	.03
Food market	2.5	.3	10.0	1.4	.11
All weather road (asphalt)	1.9	.1	9.5	1.8	.14
Dry weather road	1.3	.1	9.5	1.2	.09
Agricultural extension service	1.3	.2	4.0	.9	.07
Veterinary service	1.5	.2	4.0	1.0	.07
Fertilizer provider	3.0	.3	8.0	1.6	.12
Improved seed provider	3.0	.3	8.0	1.6	.12
pest/herb/insecticides provider	3.0	.3	8.0	1.6	.12
Police station	2.8	.3	6.0	1.2	.09
Primary court	1.1	.2	4.0	.8	.06
Microfinance	3.0	.3	9.0	1.7	.13
Source of firewood	.8	.2	8.0	.9	.07
Cooperative office	1.1	.2	6.0	.8	.06

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.6.2 Utilization of and Satisfaction with Basic Facilities/Services

As presented in table 4.34 below, the survey results have shown that all of the households of members of cooperatives reported utilization of the nearest Source of drinking water during dry and rainy season (100 percent), food market (99.4 percent), milling service (98.8 percent), source of fire wood (98.8 percent), veterinary service and agricultural extension service (96.4 percent each), dry weather road (94.3 percent) and fertilizer provider (91.9 percent). On the other hand, only few households have reported utilization of the nearest available postal service (2.9 percent), secondary school (10.3 percent), Clinic (13.8 percent), health center (31 percent), hospital (26.7 percent) and police station (30.6 percent). The majorities of households of members of cooperatives have also confirmed to use the nearest primary school (74.4 percent), health post (82.7 percent), telecommunication (69.6 percent), all weather road (86.8 percent), improved seed provider (74.7 percent), primary court (81.1 percent), microfinance (86.5 percent) and cooperative office (68.5 percent).

Table 4.34: Extent of using the service giving institutions

	Don't use at all		Occasionally		Often		Always	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Primary school	43	25.0%	1	.6%	0	.0%	128	74.4%
Secondary school	154	88.5%	1	.6%	1	.6%	18	10.3%
Health post	9	5.2%	7	4.0%	14	8.1%	143	82.7%
Nucleus health center	91	83.5%	1	.9%	2	1.8%	15	13.8%
Health center	97	55.7%	6	3.4%	17	9.8%	54	31.0%
Hospital	117	68.0%	6	3.5%	3	1.7%	46	26.7%
Prenatal/postnatal care	44	25.6%	18	10.5%	9	5.2%	101	58.7%
Telecommunication	34	19.9%	14	8.2%	4	2.3%	119	69.6%
Postal service	167	96.0%	2	1.1%	0	.0%	5	2.9%
Public transport	48	27.6%	36	20.7%	8	4.6%	82	47.1%
Grind mills	1	.6%	0	.0%	1	.6%	171	98.8%
Drinking water (dry season)	0	.0%	0	.0%	0	.0%	172	100.0%
Drinking water (rainy season)	0	.0%	0	.0%	0	.0%	172	100.0%
Food market	1	.6%	0	.0%	0	.0%	173	99.4%
All weather road (asphalt)	19	10.9%	1	.6%	3	1.7%	151	86.8%
Dry weather road	4	2.3%	1	.6%	5	2.9%	164	94.3%
Agricultural extension service	2	1.2%	2	1.2%	2	1.2%	167	96.5%
Veterinary service	4	2.3%	1	.6%	1	.6%	167	96.5%
Fertilizer provider	8	4.6%	5	2.9%	1	.6%	159	91.9%
Improved seed provider	38	21.8%	5	2.9%	1	.6%	130	74.7%
pest/herb/insecticides provider	42	24.6%	11	6.4%	11	6.4%	107	62.6%
Police station	80	46.2%	11	6.4%	29	16.8%	53	30.6%
Primary court	3	1.8%	12	7.1%	17	10.1%	137	81.1%
Microfinance	4	2.4%	4	2.4%	15	8.8%	147	86.5%
Source of firewood	0	.0%	1	.6%	1	.6%	168	98.8%
Cooperative office	40	23.8%	12	7.1%	1	.6%	115	68.5%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.6.3 Reason for Not Using the Nearest Facilities

Households that do not use or occasionally use any of the indicated facilities at their closest vicinity were further asked to state their reasons for not doing so. The major reasons cited for high proportion of households of members of cooperatives that reported not to use hospital (74.6 percent), all weather road (94.4 percent) and dry weather road are far distance to the service while those reported not to use primary school, secondary school, telecommunication, agricultural extension service, veterinary service, improved seed provider, fertilizer provider, insecticide/pesticide provider, police station, primary court, microfinance and source of fire wood were in no need of that facility. Households of members of cooperatives that do not use their cooperative office 33.3 percent of the respondents said that absence of need for that facility, 18.4 percent responded inadequate service and 49 percent are classified in the "other" group (see table 4.35).

Households that use the nearest basic facilities/services were additionally asked whether they are satisfied with the services or not. Change in the quality of the services over the past one year prior to the survey was also assessed. The survey results have shown that out of the households that reported utilization of the nearest basic facilities, the majority (74.2 to 100 percent) responded that they are satisfied with the services provided by each of the facilities. The lowest satisfaction (42.9 percent) responded was for the services delivered by the police station (see table 4.36 below).

Figure 4.35: Reason for not using or occasionally using the service giving institutions

	Far away		Expensive		Poor service delivery		No enough staff and/or equipment		Inadequate service		Don't need it		Other	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Primary school	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Secondary school	.6%	99.4%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	98.7%	1.3%	.7%	99.3%
Health post	.0%	100.0%	.0%	100.0%	18.8%	81.3%	.0%	100.0%	25.0%	75.0%	56.3%	43.8%	.0%	100.0%
Nucleus health center	39.6%	60.4%	2.2%	97.8%	.0%	100.0%	.0%	100.0%	1.1%	98.9%	58.2%	41.8%	.0%	100.0%
Health center	29.4%	70.6%	2.9%	97.1%	2.9%	97.1%	.0%	100.0%	4.9%	95.1%	61.2%	38.8%	.0%	100.0%
Hospital	74.6%	25.4%	1.6%	98.4%	.0%	100.0%	.0%	100.0%	.0%	100%	24.6%	75.4%	.0%	100.0%
Prenatal/postnatal care	8.2%	91.8%	.0%	100.0%	.0%	100.0%	.0%	100.0%	3.3%	96.7%	86.9%	13.1%	1.6%	98.4%
Telecommunication	26.1%	73.9%	12.8%	87.2%	.0%	100.0%	.0%	100.0%	.0%	100%	57.4%	42.6%	2.1%	97.9%
Postal service	32.7%	67.3%	.6%	99.4%	.0%	100.0%	.0%	100.0%	.6%	99.4%	65.5%	34.5%	.6%	99.4%
Public transport	39.5%	60.5%	47.6%	52.4%	1.2%	98.8%	.0%	100.0%	.0%	100%	14.6%	85.4%	.0%	100.0%
All weather road (asphalt)	94.4%	5.6%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	5.6%	94.4%	.0%	100.0%
Dry weather road	100.0%	.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	.0%	100.0%	.0%	100.0%
Agricultural extension service	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Veterinary service	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Fertilizer provider	.0%	100.0%	10.0%	90.0%	.0%	100.0%	.0%	100.0%	.0%	100%	77.8%	22.2%	11%	88.9%
Improved seed provider	.0%	100.0%	2.4%	97.6%	.0%	100.0%	.0%	100.0%	2.4%	97.6%	95.0%	5.0%	.0%	100.0%
pest/herb/insecticides provider	3.9%	96.1%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	98.0%	2.0%	2.0%	98.0%
Police station	3.4%	96.6%	.0%	100.0%	.0%	100.0%	.0%	100.0%	1.1%	98.9%	96.6%	3.4%	.0%	100.0%
Primary court	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Microfinance	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Source of firewood	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100.0%	.0%	100%	100%	.0%	.0%	100.0%
Cooperative office	2.0%	98.0%	.0%	100.0%	.0%	100.0%	2.0%	98.0%	18.4%	81.6%	33.3%	66.7%	49%	51.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.36: Service delivery satisfaction of the households by the service giving institutions

	Service delivery satisfaction				Total	
	Satisfied		Not satisfied			
	Count	Percent	Count	Percent	Count	Percent
Primary school	113	89.0%	14	11.0%	127	100.0%
Secondary school	17	85.0%	3	15.0%	20	100.0%
Health post	115	74.2%	40	25.8%	155	100.0%
Nucleus health center	18	81.8%	4	18.2%	22	100.0%
Health center	58	78.4%	16	21.6%	74	100.0%
Hospital	50	92.6%	4	7.4%	54	100.0%
Prenatal/postnatal care	102	91.9%	9	8.1%	111	100.0%
Telecommunication	117	97.5%	3	2.5%	120	100.0%
Postal service	5	100.0%	0	.0%	5	100.0%
Public transport	83	90.2%	9	9.8%	92	100.0%
Grind mills	162	95.9%	7	4.1%	169	100.0%
Drinking water (dry season)	131	76.2%	41	23.8%	172	100.0%
Drinking water (rainy season)	134	77.9%	38	22.1%	172	100.0%
Food market	167	98.2%	3	1.8%	170	100.0%
All weather road (asphalt)	125	81.7%	28	18.3%	153	100.0%
Dry weather road	139	83.2%	28	16.8%	167	100.0%
Agricultural extension service	170	99.4%	1	.6%	171	100.0%
Veterinary service	166	98.8%	2	1.2%	168	100.0%
Fertilizer provider	162	99.4%	1	.6%	163	100.0%
Improved seed provider	133	99.3%	1	.7%	134	100.0%
pest/herb/insecticides provider	117	95.9%	5	4.1%	122	100.0%
Police station	39	42.9%	52	57.1%	91	100.0%
Primary court	148	93.7%	10	6.3%	158	100.0%
Microfinance	163	99.4%	1	.6%	164	100.0%
Source of firewood	20	95.2%	1	4.8%	21	100.0%
Cooperative office	105	82.0%	23	18.0%	128	100.0%
Total	2759	88.9%	344	11.1%	3103	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Households utilizing the nearest basic facilities were also asked whether they have experienced any change in the quality of the services provided by the nearest facilities over the 12 months prior to the survey period. The table below shows that 32.6 percent to 96.4 percent of the households of members of cooperatives reported that the services rendered by the selected facilities are becoming better over the 12 months period prior to the survey date. The proportion of rural households in the study area that has reported the services to remain being under the same quality over the period under consideration ranged from 2.4 percent to 66.3 percent. The

proportion that reported worsening conditions is below 9.1 percent. Microfinance (96.4 percent) and telecommunication 95.8 percent) services are reported to have the highest percentage of improvement followed by agricultural input services (90.2 percent to 92.7 percent) reported for improvement. Police station (66.3 percent) and health centre (52.7 percent) of the total households have reported that the services have remained the same. In general, 77.9 percent of the households in the survey area have reported that services provided by the nearest facilities are improving, 20.6 percent reported for remaining the same and 1.4 percent reported the services rendered are decreasing in quality.

Table 4.37: The current service delivery quality of the service giving institutions compared to the services which were delivered 12 months ago.

	Decreasing		Same		Increasing		Don't know	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Primary school	0	.0%	30	23.4%	98	76.6%	0	.0%
Secondary school	0	.0%	7	35.0%	13	65.0%	0	.0%
Health post	3	1.9%	62	40.0%	90	58.1%	0	.0%
Nucleus health center	1	4.5%	4	18.2%	17	77.3%	0	.0%
Health center	0	.0%	39	52.7%	35	47.3%	0	.0%
Hospital	0	.0%	10	19.6%	41	80.4%	0	.0%
Prenatal/postnatal care	2	1.8%	25	22.7%	83	75.5%	0	.0%
Telecommunication	1	.8%	4	3.3%	115	95.8%	0	.0%
Postal service	0	.0%	1	20.0%	4	80.0%	0	.0%
Public transport	1	1.1%	19	20.9%	71	78.0%	0	.0%
Grind mills	4	2.4%	32	18.8%	134	78.8%	0	.0%
Drinking water (dry season)	3	1.7%	66	38.4%	103	59.9%	0	.0%
Drinking water (rainy season)	2	1.2%	63	36.6%	107	62.2%	0	.0%
Food market	1	.6%	29	17.0%	141	82.5%	0	.0%
All weather road (asphalt)	5	3.2%	39	25.3%	110	71.4%	0	.0%
Dry weather road	6	3.6%	38	22.6%	124	73.8%	0	.0%
Agricultural extension service	2	1.2%	12	6.9%	159	91.9%	0	.0%
Veterinary service	3	1.8%	11	6.4%	157	91.8%	0	.0%
Fertilizer provider	1	.6%	11	6.7%	153	92.7%	0	.0%
Improved seed provider	2	1.5%	9	6.6%	125	91.9%	0	.0%
pest/herb/insecticides provider	1	.8%	11	9.0%	110	90.2%	0	.0%
Police station	1	1.1%	61	66.3%	30	32.6%	0	.0%
Primary court	2	1.2%	24	14.9%	135	83.9%	0	.0%
Microfinance	1	.6%	4	2.4%	160	96.4%	1	.6%
Source of firewood	2	9.1%	1	4.5%	19	86.4%	0	.0%
Cooperative office	1	.8%	32	24.8%	96	74.4%	0	.0%
Total	45	1.4%	644	20.6%	2430	77.9%	1	.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.6.4 Mode of Transport to Reach the Service Delivering Institutions

The table below indicated that almost all of the rural households (94 percent to 100 percent) in the zone travel on foot to reach the service delivering institutions. Only 6 percent and 4.3 percent of the total households reported that they use public transport or pack animals to reach hospital and police station, respectively.

Table 4.38: Mode of transport to reach the service delivery institutions.

	On foot		Bicycle		Motor cycle		Public transport/ pack animals	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Primary school	127	100.0%	0	.0%	0	.0%	0	.0%
Secondary school	20	100.0%	0	.0%	0	.0%	0	.0%
Health post	153	98.7%	0	.0%	1	.6%	1	.6%
Nucleus health center	22	100.0%	0	.0%	0	.0%	0	.0%
Health center	76	100.0%	0	.0%	0	.0%	0	.0%
Hospital	47	94.0%	0	.0%	0	.0%	3	6.0%
Prenatal/postnatal care	107	99.1%	1	.9%	0	.0%	0	.0%
Telecommunication	119	100.0%	0	.0%	0	.0%	0	.0%
Postal service	7	100.0%	0	.0%	0	.0%	0	.0%
Public transport	39	100.0%	0	.0%	0	.0%		
Grind mills	164	98.8%	1	.6%	1	.6%	0	.0%
Drinking water (dry season)	166	97.6%	3	1.8%	1	.6%	0	.0%
Drinking water (rainy season)	166	98.8%	1	.6%	1	.6%	0	.0%
Food market	162	99.4%	0	.0%	1	.6%	0	.0%
All weather road (asphalt)	63	100.0%	0	.0%	0	.0%		
Dry weather road	69	100.0%	0	.0%	0	.0%		
Agricultural extension service	169	99.4%	0	.0%	1	.6%	0	.0%
Veterinary service	167	99.4%	0	.0%	1	.6%	0	.0%
Fertilizer provider	162	99.4%	0	.0%	1	.6%	0	.0%
Improved seed provider	133	99.3%	0	.0%	1	.7%	0	.0%
pest/herb/insecticides provider	120	98.4%	0	.0%	1	.8%	1	.8%
Police station	88	95.7%	0	.0%	0	.0%	4	4.3%
Primary court	158	98.8%	0	.0%	2	1.3%	0	.0%
Microfinance	168	99.4%	0	.0%	1	.6%	0	.0%
Source of firewood	162	99.4%	0	.0%	1	.6%	0	.0%
Cooperative office	129	99.2%	0	.0%	1	.8%	0	.0%
Total	2963	99.0%	6	.2%	15	.5%	9	.3%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.7 Possessions of Household Assets

Asset ownership is one of the indicators of economic well-being of the households. Acquisition of assets could be a manifestation of improving living standard of households of members of cooperatives in rural central zone of Tigray.

4.2.7.1 Asset Ownership

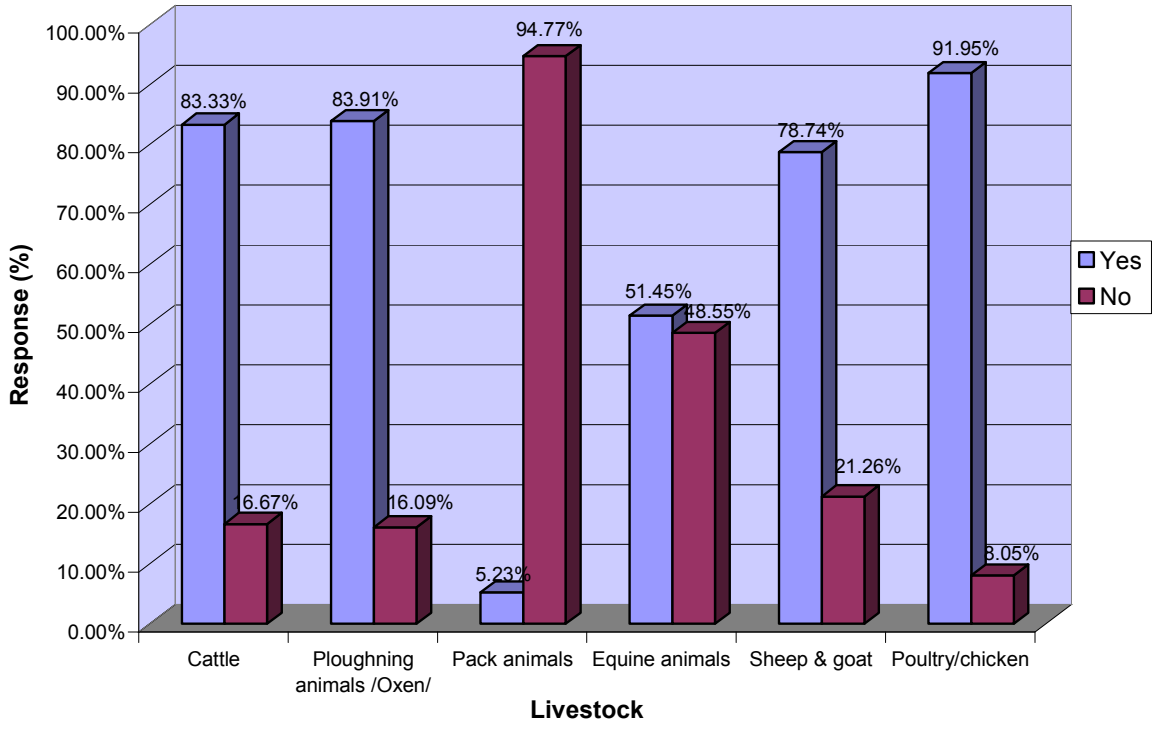
Table 4.39 and bar graph 4.7 below presents the distribution of households that possess different types of selected household assets for the year 2008. According to the survey result, the majority of the rural households of members of cooperatives possess farming equipment such as “Newit” & “Aruet”, Plough, Sickle and Axe ranging from 96.6 percent to 98.9 percent. Cattle, sheep & goats, poultry and oxen (ploughing animals) are also owned by large proportion of households in the study area ranging from 78.7 percent to 92 percent. The findings of the survey revealed that there is a better possession of ploughing animals (83.9 percent) in the study area. Only 51.4 percent of the rural households are found to own equine animals and the majority of the households (86.8 percent) own blanket or “gabi”. A good number of households in the rural area (37.4 percent) own radio and 37.9 percent of the households own watches or clocks. 2.9 percent and 3.4 percent of the total households own telephone and jewel (gold, silver, etc.), respectively.

Table 4.39: Ownership of household assets.

	Yes		No	
	Count	Percent	Count	Percent
Cattle	145	83.3%	29	16.7%
Ploughning animals /Oxen/	146	83.9%	28	16.1%
Pack animals	9	5.2%	163	94.8%
Equine animals	89	51.4%	84	48.6%
Sheep & goat	137	78.7%	37	21.3%
Poultry/chicken	160	92.0%	14	8.0%
"Newit & Aruet	171	98.3%	3	1.7%
Sickle	172	98.9%	2	1.1%
Axe	169	97.1%	5	2.9%
Pick axe	172	98.9%	2	1.1%
Plough	168	96.6%	6	3.4%
Stove /Gas, Electric/	13	7.5%	161	92.5%
Blanket /"Gabi"/	151	86.8%	23	13.2%
Mattresses and/or beds	55	31.6%	119	68.4%
Watches or clocks	66	37.9%	108	62.1%
Iron /Electric or charcoal/	0	.0%	174	100.0%
Telephone	5	2.9%	169	97.1%
Radio	65	37.4%	109	62.6%
Television	0	.0%	174	100.0%
Video deck	0	.0%	174	100.0%
Sofa set	0	.0%	174	100.0%
Table & chair	1	.6%	173	99.4%
Bicycle	0	.0%	174	100.0%
Cart	1	.6%	173	99.4%
Sewing machine	0	.0%	174	100.0%
Loom	0	.0%	174	100.0%
Refrigerator	0	.0%	174	100.0%
Jewel /Gold, silver/	6	3.4%	168	96.6%
Car /Private, business/	0	.0%	173	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.7 Livestock Ownership of Households



The average number of assets owned per household is found to be 1.79, 1.54, 6.97 and 7.91 for cattle, oxen, sheep & goat and poultry/chicken/, respectively. This implies that large numbers of households do not own two oxen minimum number required to till their land. The average number of "Newit" & "Aruet", sickle, axe and plough are found to be 2.6, 3.28, 1.95 and 2.05 per household showing good possession of farm equipments by rural households of members of cooperatives in central zone.

Table 4.40: Number of the household assets owned by the household

	Mean	Minimum	Maximum	Std Deviation	Standard Error of Mean
Cattle	1.79	0	8	1.42	.11
Ploughning animals /Oxen/	1.54	0	5	.98	.07
Pack animals	.07	0	3	.36	.03
Equine animals	.68	0	3	.77	.06
Sheep & goat	6.97	0	40	7.16	.54
Poultry/chicken	7.91	0	32	5.76	.44
"Newit & Aruet	2.60	0	7	1.19	.09
Sickle	3.28	0	10	1.56	.12
Axe	1.95	0	5	.96	.07
Pick axe	2.06	0	8	1.09	.08
Plough	2.05	0	4	.80	.06
Stove /Gas, Electric/	.10	0	2	.37	.03
Blanket /"Gabi"/	1.67	0	4	1.00	.08
Mattresses and/or beds	.55	0	3	.91	.07
Watches or clocks	.41	0	2	.56	.04
Iron /Electric or charcoal/	.00	0	0	.00	.00
Telephone	.02	0	1	.13	.01
Radio	.37	0	2	.52	.04
Television	.00	0	0	.00	.00
Video deck	.00	0	0	.00	.00
Sofa set	.00	0	0	.00	.00
Table & chair	.02	0	2	.21	.02
Bicycle	.00	0	0	.00	.00
Cart	.01	0	1	.08	.01
Sewing machine	.00	0	0	.00	.00
Loom	.00	0	0	.00	.00
Refrigerator	.00	0	0	.00	.00
Jewel /Gold, silver/	.00	0	0	.00	.00
Car /Private, business/	.00	0	0	.00	.00

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.41 below revealed that there is no change on household durables as compared to the number owned on the last 12 months prior to the survey period. No change on cattle (53.8 percent), oxen (72.8 percent), pack animals (95.3 percent) and equine animals (83.2 percent) was observed on the households in the survey area. One out of five and 27.7 percent of the households showed a decrease in sheep & goat and on poultry /chicken/ number owned, respectively. No significant change was also observed on farm implements owning number a year ago and now, respectively. “Newit” & “Aruet” (76.9 percent), sickle (68.2 percent), axe (79.8 percent) and plough (82.1 percent) of the total households of members of cooperatives in rural central zone reported no change in the number currently owned as compared to the 12 months prior to the survey period.

Table 4.41: The number of currently owned household assets as compared to the number 12 months ago.

	Increased	No change	Decreased
Cattle	39.9%	53.8%	6.4%
Ploughning animals /Oxen/	23.1%	72.8%	4.0%
Pack animals	1.2%	95.3%	3.5%
Equine animals	9.8%	83.2%	6.9%
Sheep & goat	43.4%	37.0%	19.7%
Poultry/chicken	44.5%	27.7%	27.7%
"Newit & Aruet	18.5%	76.9%	4.6%
Sickle	30.1%	68.2%	1.7%
Axe	18.5%	79.8%	1.7%
Pick axe	20.2%	77.5%	2.3%
Plough	14.5%	82.1%	3.5%
Stove /Gas, Electric/	1.2%	98.8%	.0%
Blanket /"Gabi"/	24.6%	74.3%	1.2%
Mattresses and/or beds	7.6%	92.4%	.0%
Watches or clocks	7.5%	91.9%	.6%
Iron /Electric or charcoal/	.6%	99.4%	.0%
Telephone	1.7%	98.3%	.0%
Radio	8.1%	91.9%	.0%
Television	.0%	100.0%	.0%
Video deck	.0%	100.0%	.0%
Sofa set	.0%	100.0%	.0%
Table & chair	.0%	100.0%	.0%
Bicycle	.0%	100.0%	.0%
Cart	.0%	100.0%	.0%
Sewing machine	.0%	100.0%	.0%
Loom	.0%	100.0%	.0%
Refrigerator	.0%	100.0%	.0%
Jewel /Gold, silver/	.0%	100.0%	.0%
Car /Private, business/	.0%	100.0%	.0%

Source: Field survey - January 2008.

4.2.7.2 Ownership of a Dwelling by Any Member of the Household

The data below indicted that 92.5 percent of the households reported to own a dwelling. Almost 76 percent of the total households own one dwelling while one out of ten households own two dwelling. The average number of dwelling per household is found to be 1.25. No significant change in percentage was observed over the last 5 years and over the last 12 months as compared to the current year on the status of ownership by the household members. A decline from 80.5 percent to 75.9 percent was observed over the last five years on the number of dwelling owned by the household members with one dwelling as compared to the current year and over the last 12 months prior to the survey period.

Table 4.42: Ownership of dwelling or other buildings by any member of the HH and its number.

		Now		12 months ago		5 years ago	
		Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Ownership of dwelling & other building	Yes	161	92.5%	162	93.1%	160	92.0%
	No	13	7.5%	12	6.9%	14	8.0%
Total		174	100.0%	174	100.0%	174	100.0%
No. of dwelling or other building	Zero	10	5.7%	9	5.2%	9	5.2%
	One	132	75.9%	132	75.9%	140	80.5%
	Two	18	10.3%	19	10.9%	19	10.9%
	Three	8	4.6%	8	4.6%	3	1.7%
	Four	4	2.3%	4	2.3%	1	.6%
	Five	2	1.1%	2	1.1%	2	1.1%
Total		174	100.0%	174	100.0%	174	100.0%

Source: Field survey - January 2008.

Table 4.43: Current number of dwelling or other buildings owned.

No. of dwelling or other building	Mean	1.25
	Minimum	0
	Maximum	5
	Std Deviation	.82
	Standard Error of Mean	.06

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.7.3 Ownership of Land

Table 4.44 and 4.45 below show no change on both status of ownership on land and size of land owned by members of household was observed over the last 5 years and a year ago as compared to the current year. The average size of land owned per household is found to be 5,645.29 sq.m. However, as the standard error 231.34 is high the data should be handled in cautious.

Table 4.44: Ownership of land by any member of the household

		Now		12 months ago		5 years ago	
		Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**
Ownership of land by any member of the household	Yes	170	97.7%	170	97.7%	169	97.1%
	No	4	2.3%	4	2.3%	5	2.9%
Total		174	100.0%	174	100.0%	174	100.0%
Total area of land (in sq.mt.) owned	500 - 3000 sq.mt.	42	24.7%	42	24.7%	42	24.9%
	3001 - 6000 sq.mt.	71	41.8%	71	41.8%	70	41.4%
	6001 - 10000 sq.mt.	50	29.4%	50	29.4%	50	29.6%
	> 10000 sq.mt.	7	4.1%	7	4.1%	7	4.1%
Total		170	100.0%	170	100.0%	169	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.45: Area of land (in sq.mt.) owned.

Mean	5645.29
Minimum	1000
Maximum	16000
Std Deviation	3016.31
Standard Error of Mean	231.34

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.2.7.4 Status of Using Land that is Not-owned by the Household

Using land that is not your own for cultivation as source of income is common in the study area. The data on the table below shows 42.5 percent of the households of members of cooperatives use land that is not their own as source of income. However, there is a decreasing trend on the percentage of households that rented in land from 47.4 percent 5 years ago to 42.2 percent 12 months ago prior to the survey period and again to 39.7 percent in the current year (see table 4.46).

Out of the total households that currently use land that is not their own, 28.6 percent of them reported that the size has decreased, 40.3 percent reported no change and 31.2 percent reported that the size has increased (see table 4.47).

Table 4.46: Response on the use of land which is not owned by the household.

	Now		12 months ago		5 years ago	
	Count	Percent	Count	Percent	Count	Percent
Do not use	100	57.5%	94	54.3%	84	48.6%
Rent in	69	39.7%	73	42.2%	82	47.4%
Share cropped	3	1.7%	3	1.7%	3	1.7%
Use for free	2	1.1%	3	1.7%	4	2.3%
Total	174	100.0%	173	100.0%	173	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.47: Current size of land used as compared to the size 12 months or 5 years ago. [Only considering HHs who use land which is not owned by themselves]

	Count	Percent
Decreased	22	28.6%
No change	31	40.3%
Increased	24	31.2%
Total	77	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.3 Indicators of Household Living Conditions

Households were asked to provide information on their condition with respect to food security, general living standard and major shocks faced by the household which reflect the existing living condition of households using subjective information collected from sample households.

4.3.1 Difficulty in Satisfying Food Needs

For the purpose of this survey food shortage is defined as the situation where a household is unable to feed themselves during any month of the year (source: CSA). According to the survey, the situation of food shortage is serious problem for the majority of the households where 59.2 percent of the households of members of cooperatives have confirmed the occurrence of food shortage during the last 12 months prior to the survey period. Among those households that reported to have food shortage over the year preceding the survey, more than three-fourth (78.3 percent) indicated the shortage was for three to six months of the year. The study also included further questions on what was the alternative solution for the food shortage faced and the overwhelming majority of the households of members of cooperatives (72.3 percent) responded that “safety net” program as a solution to their food shortage while one out of five responded “buying” of food stuffs from market was the measures taken by them. Only 4.8 percent of the total households responded “aid” as a solution for the food shortage faced (see tables 4.48 and 4.49).

4.3.2 Sufficiency of Own Crop Production

The findings on the table and bar chart below presents on how long household’s current year own crop production lasts in feeding the households. Table 4.50 shows that out of the total households in the study area, only 6.3 percent reported to have enough own production that lasts for 11-12 months in feeding the households. Only one out of five of the households reported that their crop production could take them at least 9 months while 56.9 percent of the households believe that their production lasts for 7 or more months, 86.8 percent have indicated that their production could take them five to twelve months. On the other hand, 13.2 percent of the households reported that their current year production is only sufficient for up to four months.

Table 4.48: Occurrence of food shortage during the last 12 months.

		Count	Percent
Occurrence of food shortage during the last 12 months	Yes	103	59.2%
	No	71	40.8%
Total		174	100.0%
Number of months of food shortage	=< 2 months	21	20.8%
	3 - 4 months	55	54.5%
	5 - 6 months	24	23.8%
	> 6 months	1	1.0%
Total		101	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.49: Measure taken to solve the food shortage.

		Count	Percent
Solution for food shortage	Safety net	60	72.3%
	Aid	4	4.8%
	Buying	18	21.7%
	Other	1	1.2%
Total		83	100.0%

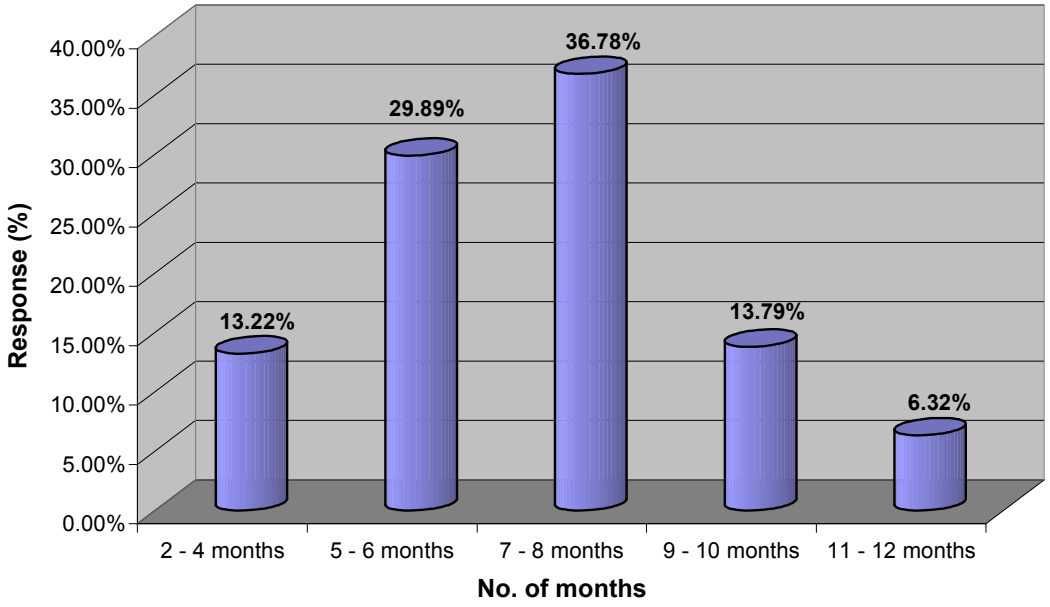
Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.50: The number of months that this year's production subsists.

	Count	Percent
2 - 4 months	23	13.2%
5 - 6 months	52	29.9%
7 - 8 months	64	36.8%
9 - 10 months	24	13.8%
11 - 12 months	11	6.3%
Total	174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Figure 4.8 Distribution of Households by Number of Months the Current Year Production Lasts



4.3.3 Status of Living Standard

The table below depicts the results of the survey obtained from inquiries on comparative situation of the households' current living standard with that of 12 months ago. Households' and community conditions of food security and the general living standard of the society had been assessed in this survey.

Living standard with respect to food (see table 4.51) shows that 10.3 percent of the total households have a little better condition comparing the condition as of the survey time with that of a year ago. According to the results of the survey, 50.6 percent of the total households of members of cooperatives believe that their condition with respect to food has decreased a little while 33.3 percent of the total households indicate unchanged conditions over the 12 months period. The results obtained from the survey indicate that the remaining 4.6 percent of the households are in a worse condition with respect to food.

In comparing the general living conditions of the households, 38.5 percent of the total households reported that their living standard has decreased a little, 10.3 percent experienced a little increased condition of livelihood and almost half of the total households (47.7 percent) had not come across of any change in their living condition over the period under comparison. It is also wise to see from the table below that 2.9 percent of the total households are in a worse condition of living.

The general living standard of the community as felt by the households has also been assessed. The results indicate that only 7.5 percent of the households of members of cooperatives reported a little better standard of living in the community while 42 percent of the households reported a decreasing condition of living standard of the community. Almost half of the total population (48.3 percent) reported that no change in the standard of living in the community was observed and 2.3 percent explained worse condition of living in the community. Regarding conditions of clothing 62.6 percent of the total households responded no change in condition of clothing and 9.2 percent of the total households reported that condition of clothing has increased a little as compared to 12 months prior to the survey period.

4.3.4 Household's Capability to Raise 100 Birr for any Contingency

The survey questionnaire also included an additional component intended to indicate household's financial situation. Sample households were asked whether or not they are able to raise 100 birr within a week time for unforeseen condition and what major potential sources they utilize to generate the money (see table 4.52).

According to the findings of the survey, 97.1 percent of the total households are able to produce 100 birr within a week time. The major sources of raising 100 birr are 59.2 percent sales of animal & animal products, 14.8 percent loan from relatives, 11.2 percent sales of crops and 8.9 percent own cash.

Table 4.51: The conditions of the HH as compared to 12 months ago – in terms of Food, Clothing & Livelihood.

	Worse		Decreased a little		Similar		Increased a little		Much better		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Conditions of food	8	4.6%	88	50.6%	58	33.3%	18	10.3%	2	1.1%	174	100.0%
Conditions of Clothing	2	1.1%	46	26.4%	109	62.6%	16	9.2%	1	.6%	174	100.0%
Conditions of the household livelihood	5	2.9%	67	38.5%	83	47.7%	18	10.3%	1	.6%	174	100.0%
Conditions of the community livelihood	4	2.3%	73	42.0%	84	48.3%	13	7.5%	0	.0%	174	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.52: Possibility of getting 100 birr in case of any emergency.

		Count	Percent
Possibility of getting the money	Yes	169	97.1%
	No	5	2.9%
Total		174	100.0%
The possible source of money	Sales of animal & animal products	100	59.2%
	Sales of crops	19	11.2%
	Own cash	15	8.9%
	Loan from bank or other saving institutions	7	4.1%
	Loan from relatives	25	14.8%
	Asking relatives for free	2	1.2%
	Loan from non-relatives	1	.6%
Total		169	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.3.5 Major Shocks

This section deals with the major shocks that the households suffered during the 12 months period prior to the survey date. Households were asked to give information on their experience in the shocks that seriously affected their livelihood during the reference period. The survey findings disclosed that 40.8 percent of the total households of members of cooperatives suffered

from food shortage. 5.2 percent of the households have been encountered with shocks as a result of death of household member while illness of household member and drought shocks stood at 2.9 percent each. Crop damage and death of livestock are also reported to occur on 2.3 percent and 1.1 percent, respectively of the total households of members of cooperatives in the rural areas of central zone.

Table 4.53: Major shocks during the last 12 months.

	Occurred		Not occurred		Total	
	Count	Percent	Count	Percent	Count	Percent
Death of HH member	9	5.2%	164	94.8%	173	100.0%
Illness of HH member	5	2.9%	168	97.1%	173	100.0%
Loss of job of HH member	0	.0%	173	100.0%	173	100.0%
Food shortage	71	40.8%	103	59.2%	174	100.0%
Drought	5	2.9%	169	97.1%	174	100.0%
Flood	0	.0%	174	100.0%	174	100.0%
Crop damage	4	2.3%	170	97.7%	174	100.0%
Death of livestock	2	1.1%	172	98.9%	174	100.0%
Price shock	0	.0%	174	100.0%	174	100.0%
Other	3	1.7%	171	98.3%	174	100.0%
Total	99	5.7%	1638	94.3%	1737	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.4 HIV/AIDS Knowledge and Practice

Acquired Immune Deficiency Syndrome (AIDS) is caused by a human immunodeficiency virus (HIV) that weakens the immune system of human beings, making the body susceptible and unable to recover from other diseases.

The incidence of HIV/AIDS is significantly high in the region. The impact of the disease is detrimental because it greatly affects the active working group of the population, which is quite essential for development. The disease can be controlled through avoiding pre-marriage sex, having only one to one sexual partner and/or using condom during relationship.

4.4.1 Knowledge of Existence of HIV/AIDS and Infection Channels

All sampled households of members of cooperatives in rural central zone were asked whether they know the existence of HIV/AIDS. Of the total households in the survey area, 94.8 percent have replied positively (see table 4.54).

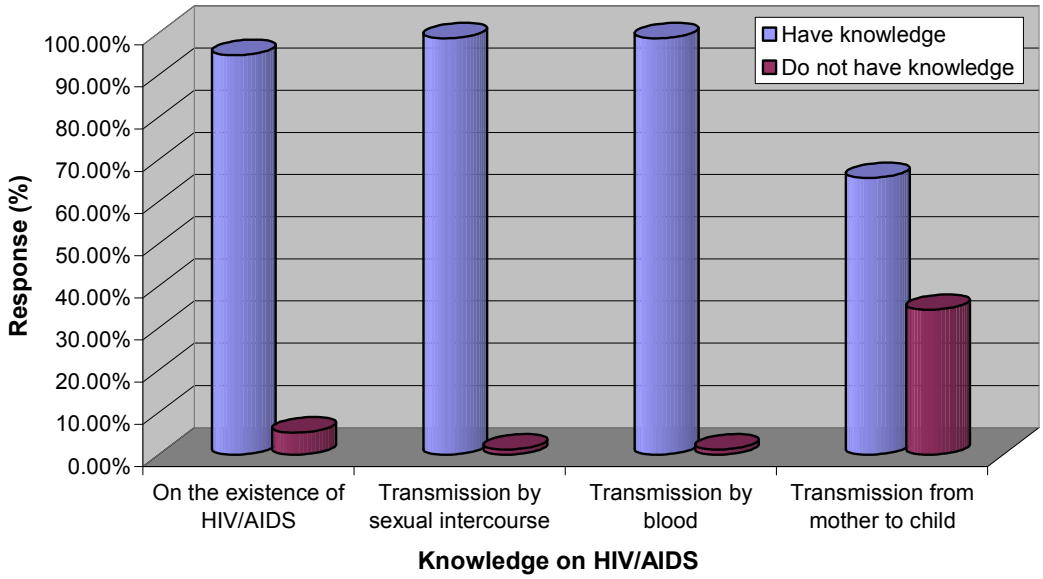
Information was also collected on whether or not households know how to get infected with HIV/AIDS (see table 4.54 and Figure 4.9). Out of those households that reported to have knowledge about HIV/AIDS, a higher percentage of households (98.8 percent) do know that HIV/AIDS can be transmitted through sexual intercourse and through blood contact. Knowledge about mother to child transmission of HIV/AIDS is reported by a lesser percentage of households of members of cooperatives in rural central zone (65.6 percent).

Table 4.54: Knowledge on existence of HIV/AIDS and its transmission.

	Have knowledge		Do not have knowledge		Total	
	Count	%	Count	%	Count	%
On the existence of HIV/AIDS	163	94.8%	9	5.2%	172	100.0%
Transmission by sexual intercourse	161	98.8%	2	1.2%	163	100.0%
Transmission by blood	161	98.8%	2	1.2%	163	100.0%
Transmission from mother to child	107	65.6%	56	34.4%	163	100.0%

Source: Field survey - January 2008.
Note: only valid data are considered; Missing values are not counted.

Figure 4.9: Knowledge on HIV/AIDS transmission



One out of five respondents reported that they know HIV/AIDS victims in their tabia over the last 12 months while 69.4 percent replied they do not know whether there was a victim in the tabia or not. One out of 10 of the respondents said that there was no victim in their tabia over the last 12 months prior to the survey period.

Table 4.55: Knowledge if there are HIV/AIDS victims during the last 12 months at the tabia where the HH is living.

	Count	Percent
Yes	32	20.0%
No	16	10.0%
Don't know	111	69.4%
Not willing to answer	1	.6%
Total	160	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.4.2 Knowledge of HIV/AIDS Prevention Methods

Data on popular prevention methods abstinence, faithfulness and use of condom has been collected. Out of those households that have knowledge about existence of HIV/AIDS, 98.8 percent believe that abstinence and being faithful protects from HIV/AIDS while the use of condom protection method is reported by only 67.1 percent of the total households.

Table 4.56: Knowledge on the HIV/AIDS protection methods.

	Have knowledge		Do not have knowledge		Total	
	Count	%	Count	%	Count	%
Being faithful	162	98.8%	2	1.2%	164	100.0%
Absteinance	162	98.8%	2	1.2%	164	100.0%
Using condom	110	67.1%	54	32.9%	164	100.0%

Source: Field survey - January 2008.
Note: only valid data are considered; Missing values are not counted.

4.5 Member Participation and Services Received from Cooperatives

4.5.1 Services Received from Cooperatives

Members of households were asked whether any member of the household aged 18 years and above is member of the cooperative. The table below indicates that out of all members of households aged 18 years and above, 50.3 percent responded that they are members of cooperatives.

Those members of households aged 18 years and above and responded that they are members of cooperatives where further asked what type of services they receive from the cooperative. The survey findings show that 62.5 percent of the members of cooperatives responded that they buy goods from the cooperatives while only 3.7 percent replied that they sale agricultural products to the cooperatives. About one-third of the members (33.3 percent) have also fallen in the category "others".

Table 4.57: Membership of cooperatives & services received. [HH members aged 18 & above]

		Count	Percent
Membership of cooperatives	Yes	216	50.3%
	No	213	49.7%
Total		429	100.0%
Services recieved	Sales of agricultural products to the cooperatives	8	3.7%
	Buy goods from the cooperatives	135	62.5%
	At least two of the above	1	.5%
	Other	72	33.3%
Total		216	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.5.2 Member Participation and Perception on Benefits from the Cooperatives

Table 4.58 shows area of participation by members of cooperatives. The results obtained from the study indicate that 31.9 percent of the members do not participate in the activities of the cooperative at all while nearly one out of five participate during the quarter and annual meetings. One out of ten have reported to participate in the cooperatives activities when they have free time and more than one third have fallen in the "others" category.

Regarding obtaining benefits from the cooperatives, 68.5 percent of the members of cooperatives have explicitly responded that they are benefited by being a member of that cooperative.

Table 4.58: Response regarding area of participation in the cooperatives and its benefit. [HH members aged 18 & above]

		Count	Percent
Area of participation	During the quarter & annual meeting	42	19.4%
	During the general assembly	2	.9%
	During elections only	7	3.2%
	When I have time only	23	10.6%
	I don't participate at all	69	31.9%
	Other	73	33.8%
Total		216	100.0%
Are you benefited by being a member	Yes	148	68.5%
	No	68	31.5%
Total		216	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.6 Extravagancy and Addiction

Members of households aged 18 years and above were asked questions on whether they spend their money on unnecessary/ luxurious/ goods or have difficulty to stop any addiction they spend their money on. The survey results on the table 4.59 indicated that 97.2 percent of the members of households aged 18 years and above do not believe they spend their money on unnecessary things. Similarly, 96.4 percent also responded that they do not have any addiction which they are not able to stop.

Table 4.59: Response on extravagancy and addiction. [HH members aged 18 & above]

		Count	Percent
Do you spend your money on unnecessary things	Yes	11	2.8%
	No	382	97.2%
Total		393	100.0%
Do you have any addiction which you are not able to stop	Yes	14	3.6%
	No	374	96.4%
Total		388	100.0%

Source: Field survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.7 Democracy, Good Governance and Human rights

Table 4.60 below indicates that out of all members of households aged 18 years and above and responded that they are members of cooperatives where asked whether they have knowledge on civic education and 58.4 percent of them responded positively. The survey findings show that of those who know about civic education 52.3 percent of the members of cooperatives responded that they also know that the schools in their nearby are providing civic education to their students while only 5.9 percent replied that the schools in their nearby are not providing civic education to their students. Sizeable number of the members of households of cooperatives (41.9 percent) have replied that they dot know whether the schools in their nearby are providing civic education to their pupils or not.

The findings from the survey have shown that almost all (99.1 percent) of the members of cooperatives do participate in tabia, woreda, kilil, … etc. elections. Regarding access to legal system it is found that 95.9 percent members of cooperatives have access to legal system of which almost 92 percent of the members of cooperatives have replied that they have not dropped any case due to inability to afford while 8.1 percent have dropped cases for financial reasons (see table 4.61).

Table 4.60: Response regarding democracy, good governance & human rights.

		Count	Percent
Membership of cooperatives	I'm member	214	47.9%
	I'm not member	233	52.1%
Total		447	100.0%
Knowledge on civic education	Have knowledge	132	58.4%
	Have not knowledge	94	41.6%
Total		226	100.0%
Provision of civic education by shools	Are providing	116	52.3%
	Are not providing	13	5.9%
	Don't know	93	41.9%
Total		222	100.0%
Participation on Tabia, Wereda, etc... elections.	I participate	221	99.1%
	I don't participate	2	.9%
Total		223	100.0%
Access to legal systems	Have access	213	95.9%
	Have not access	6	2.7%
	Don't know	3	1.4%
Total		222	100.0%

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

Table 4.61: Response regarding dropping cases due to inability to afford.

		Count	Percent
Dropping cases due to inability to afford	I've dropped	18	8.1%
	I haven't dropped	204	91.9%
Total		222	100.0%

Source: Own survey - January 2008.
Note: Only valid data are considered; Missing values are not counted.

4.8 Non-income Determinants of Poverty

In the preceding parts, the descriptive analyses of important explanatory variables, which are expected to have impact on poverty status of households was presented. In this section, to achieve the second objective of the survey, the selected explanatory variables were used to estimate the logistic regression model and to examine the non-income determinants of poverty. A logit model was fitted to estimate the effects of the hypothesized explanatory variables on the probabilities of being non-poor or not. Data was subjected to **SPSS** for **WINDOWS** to undertake the analysis.

Prior to the estimation of the model parameters, it is crucial to look into the problem of multicollinearity or association among the potential candidate variables. To this end, the variance inflation factor **(VIF)** was used to test the degree of multicollinearity among the continuous variables (see table 4.62) and contingency coefficients were also computed to check for the degree of association among the discrete variables (see table 4.63).

Table 4.62 Variance Inflation Factors (VIF) of the continuous Explanatory Variables

Varialbles (Cont.)		Collinearity Statistics	
		Tolerance	VIF
Model	FAMLYSIZ	0.86	1.16
	DEPENDEN	0.85	1.18
	AGE	0.92	1.09
	LIVESTOC	0.88	1.13
	MKT_D	0.97	1.03
	HH_ASSET	0.91	1.10
Dependent Variable: POVERTY_			

Source: Own Computation, 2008

The values of VIF for continuous variables were found to be small (i.e. values less than 10). To avoid serious problem of multicollinearity, it is quite essential to omit the variable with value 10 and more from the logit analysis. Based on the VIF result, the data have no serious problem of

multicollinearity. As a result, all the 6 explanatory variables were retained and entered into logistic regression analysis.

Similarly, the contingency coefficients, which measure the association between various discrete variables based on the chi-square, were computed in order to check the degree of association among the discrete variables. The values of contingency coefficient ranges between 0 and 1, zero indicating no association between the variables and the values close to 1 indicating a high degree of association. Accordingly, the results of the computation reveal that there was no serious problem of association among discrete explanatory variables as the contingency coefficients did not exceed 0.75, which is often taken as a cut-off point. Hence, all the 12 discrete variables were entered into logistic analysis.

Table 4.63 Contingency coefficients for Discrete Explanatory Variables [Based on Chi-square]

	sex	re_wr	health	access	house	copping	hiv_aids	democrac	extravag	addictio	nutritio	cooperat
Sex												
re_wr	0.168											
health	0.047	0.01										
access	0.19	0.098	0.033									
house	0.008	0.208	0.058	0.105								
copping	0.2	0.14	0.067	0.059	0.049							
Hiv_aids	0.097	0.187	0.033	0.16	0.067	0.114						
democrac	0.187	0.39	0.034	0.179	0.176	0.194	0.291					
extravag	0.105	0.021	0.074	0.15	0.223	0.041	0.056	0.076				
addictio	0.118	0.129	0.023	0.083	0.191	0.046	0.063	0.158	0.501			
nutritio	0.023	0.018	0.068	0.033	0.13	0.111	0.07	0.123	0.006	0.044		
cooperat	0	0.032	0.098	0.161	0.138	0.118	0.091	0.048	0.05	0.075	0.089	

Source: Own Computation, 2008

The variable poverty status was used as a dichotomous dependent variable with an expected mean value of 1 indicating the probability of being poor and, 0 otherwise.

Eventually, a set of 18 variables (6 continuous and 12 discrete) were included in the model and used in the logistic regression analysis. These variables were selected on the basis of theoretical explanations and the results of various empirical studies. To determine the best subset of

explanatory variables that are good predictors of the dependent variable, the logistic regression were estimated using enter method of Maximum Likelihood Estimation, which is available in statistical software program (in this case **SPSS** version 11). In this method all of the above mentioned variables were entered in a single step. Through estimation of the logistic regression model, some of the explanatory variables that improved the model result were selected and included in the model analysis. The variable 'Animal disease incidence' was excluded from the model as no occurrence of animal disease was reported in the study area. The definition and unit of measurement of the variables used in the model are presented in table.

Table 4.64 Definition of Explanatory Variables Used in the Model

S/No	Code	Type	Description	Expected
1	famlysiz	Cont.	Family size of the household	+ve
2	dependen	Cont.	Dependency ratio of the household	+ve
3	age	Cont.	Age of the household head in years	+ve
4	livestoc	Cont.	Number of livestock owned (Except poultry)	-ve
5	mkt_d	Cont.	Hours taken to reach the market center	+ve
6	sex	Dummy	1 if the HH head is male, else 0	-ve
7	re_wr	Dummy	1 if the HH head is able to read & write, else 0	-ve
8	health	Dummy	1 if any of the household member didn't face sickness/accident during the last 2 months, else 0	-ve
9	nutritio	Dummy	1 if the average body mass index of the HH members who are greater than or equal to 5 yrs old is >=18.5, else 0.	-ve
10	access	Dummy	1 if there is access to all basic services (i.e. school, health, tele, grind mills, water, veterinary services & agricultural extension service), else 0.	-ve
11	house	Dummy	1 if the HH owns dwelling or other building, else 0	-ve
12	hh_asset	Cont.	The number of household assets owned by the household (taken from the list on the questionnaire)	-ve
13	copping	Dummy	1 if there is possibility of getting 100 birr in case of emergency, else 0	-ve
14	hiv_aids	Dummy	1 if the HH head has knowledge of HIV/AIDS, else 0	-ve
15	democrac	Dummy	1 if there is: knowledge on civics, participation in political activities, access to the legal system; else 0	-ve
16	extravag	Dummy	1 if the HH head is extravagant, else 0	+ve
17	addictio	Dummy	1 if the HH head has any kind of addiction, else 0	+ve
18	cooperat	Dummy	1 if the HH get services from their cooperative, else o	-ve
19	Poverty_	Dummy	1 if poor, 0 if non-poor	

Source: Own definition, 2008

Binary logistic regression model was used in the present study to estimate the effects of factors determining the state of poverty of members of cooperatives in rural central zone of Tigray region. Interestingly, most of the outcomes of the model analysis are relevant and indicative of the existing situation. These are presented and discussed in the subsequent pages.

Table 4.65 Estimation of the Coefficients of Logit Model

Variables in the Equation

	Variable name	B	S.E.	Wald	df	Sig.	Odds ratio
Step 1	FAMLYSIZ	-0.280	0.185	2.294	1	**0.087*****	0.756
	DEPENDEN	-0.008	0.313	0.001	1	**0.037****	0.992
	SEX	1.063	0.873	1.481	1	0.224	2.894
	AGE	-0.021	0.026	0.680	1	0.410	0.979
	LIVESTOC	-0.023	0.039	0.372	1	**0.037****	0.977
	MKT_D	-0.176	0.252	0.486	1	0.486	0.839
	RE_WR	-0.777	0.730	1.133	1	**0.062*****	0.460
	HIV_AIDS	-0.656	1.726	0.144	1	0.704	0.519
	EXTRAVAG	-7.302	43.154	0.029	1	0.866	0.001
	ADDICTIO	-8.661	40.580	0.046	1	0.831	0.0004
	HEALTH	-1.511	0.700	4.664	1	**0.031****	0.221
	HOUSE	-0.301	1.028	0.086	1	0.770	0.740
	DEMOCRAC	-0.939	0.673	1.943	1	0.163	0.391
	COPPING	-11.242	89.840	0.016	1	**0.089*****	0.0001
	ACCESS	0.224	0.670	0.112	1	0.738	1.251
	HH_ASSET	-0.482	0.255	3.582	1	**0.032****	0.618
	NUTRITIO	-1.237	0.638	3.753	1	**0.043****	0.290
	COOPERAT	-1.636	0.632	6.699	1	**0.010***	0.195
	Constant	19.442	89.895	0.047	1	0.829	

Variable(s) entered on step 1: FAMLYSIZ, DEPENDEN, SEX, AGE, LIVESTOC, MKT_D, RE_WR, HIV_AIDS, EXTRAVAG, ADDICTIO, HEALTH, HOUSE, DEMOCRAC, COPPING, ACCESS, HH_ASSET, NUTRITIO, COOPERAT.

*, ** and **** are significant at 1%, 5% and 10% probability level, respectively.

Source: Model output, 2008

The overall model is found to be significant at the 0.01 level according to the model chi-square statistic. Hence, the null hypothesis is rejected. Therefore, it is explored to exist significant correlation between household's poverty status and the non-income dimension of poverty of members of cooperatives in rural central zone of Tigray. The model predicts 79.8 percent of the responses correctly.

Among the 18 factors considered in the model, 9 variables were found to be the determining factors of the status of non-income poverty with up to 10 percent of probability level. These variables include family size per household (FAMLYSIZ), dependency ratio (DEPENDEN), number of livestock owned (LIVESTOC), the ability of the HH head to read & write (RE_WR), health status of the household (HEALTH), copping mechanism in times of emergency (COPPING), number of household assets owned by the household (HH_ASSET), body mass index of the HH members greater or equal to 18.5 (NUTRITIO) and getting services from a cooperative (COOPERAT). Where as, the rest 9 of the 18 explanatory variables (see table 4.65) were found to have no significant influence on non-income poverty status of the households. In what follows, the effect of the significant explanatory variables on non-income poverty status of members of cooperatives in rural central zone is discussed.

Family Size: this demographic variable, FAMLYSIZ is found to be significant in determining household's non-income poverty in the zone. This variable is significant at 10% probability level and has negative association with non-income dimension of household poverty. The negative relationship, which happened to be different from the expected one, indicates that the odds ratio in favor of the probability of being poor decreases or the probability of being non-poor increases with an increase in the family size. The odds ratio of 0.756 for family size implies that, other things being constant, the probability of being non-poor increases by a factor of 0.756 as family size increases by 1. This result shows disagreement with the hypothesis that the family size is likely to play a role in determining the state of non-income poverty at a household level. This result doesn't show the problem of population growth in development rather it indicates the importance of population in development endeavours in the study area.

Dependency Ratio (DEPENDEN): this variable is found to be significant at 5% probability level in determining the non-income dimension of the household poverty. The result shows that

the variable is found to have, unlike to the expected one, negative impact on the probability of being poor in the non-income dimension in the study area. In other words, the probability that a household will be non-poor in the non-income dimension increases due to an increase in the number of dependants. The odds ratio of 0.992 implies that, ceteris paribus, the probability of falling in non-income poor group decreases by a factor of 0.992 as the number of dependents increases by one. The possible explanation can be that those households with many dependent family members could be non-poor in the non-income dimension because the dependants are also engaged in economic activities of the household. As discussed earlier, this survey revealed that 82.3 percent of the total population aged 10 years and over were involved in economic activities 12 months prior to the survey period. This shows children are also used as source of income to families in the study area.

Number of livestock owned (LIVESTOC): herd size is negatively related at 5% significance level to the probability of being poor in the non-income dimension in the area. The negative relationship is explained by the fact that herd size being a farmer's resource endowment, those sample households with large number of livestock have better chance to be in the non-poor group in the non-income dimension. This in turn enables them to send their children to school, the chance to be healthy, etc even when there is shortage for others to do so. This empirical finding suggests that the number of livestock holding is important in explaining the status of the non-income dimension of poverty of the sample population in rural central zone of Tigray. The odds ratio for the number of livestock owned indicates that, other things being constant, the probability of being poor in the non-income dimension increases by a factor of 0.977 as the number of livestock owned decreases by one. Putting differently, when the households' number of livestock owned increases by 1 the probability of the household being poor in the non-income dimension decreases by a factor of 0.977.

The ability of the HH head to read & write (RE_WR): this is a variable that stands for educational status of household head of members of cooperatives because he as a leader of the family is influential in decision making process for any sort of activities including the generation of income. In this regard, household heads that can read and write are in a better position to get out of non-income poverty. As expected, the contribution of education is negatively and

significantly (below 10 % level) associated with non-income dimension of household poverty. The odds ratio indicates that, other things being constant, the probability of the household to be poor in the non-income dimension decreases by a factor of 0.460 as the household gets educated.

Health status of the household (HEALTH): this is another important factor that is found to correlate with non-income dimension of poverty in this survey. It is if any of the household member face sickness /accident during the last 2 months then there is a likely that the household will fall under non-income poverty. The result indicates that this variable is significant at less than 5% probability level and has a negative association with household's non-income dimension of poverty situation. The relationship or association here means that the probability of a household to be poor in the non-income dimension increases if a household member gets sick/accident in the two months prior to the survey date. In other words, as any of the households' members do not get sick/accident two months prior to the survey date, the probability of being poor in the non-income dimension decreases. The odds ratio also indicates that, other things being constant, the probability of being poor in the non-income dimension increases by a factor of 0.221 as a household member gets sick within two months prior to the survey date. This signifies that having a healthy population would lead to coming out of the non-income dimension of poverty.

Copping mechanism in times of emergency (COPPING): this variable is found to negatively and significantly (at 10% probability level) influence the probability of being poor in the non-income dimension. The result of this study shows that the households in the study area have the possibility of getting 100 birr in case of emergency and has a negative impact on the households' status of poverty in the non-income dimension. The possible explanation is that as the households in the study area are able to obtain 100 Birr with in a week time, they have managed to be better-off in times of emergency. Thus, such households would have a very high probability to get out of non-income poverty compared to those who do not. In other words, the higher the capability to raise money in times of emergency would affect the probability of being non-income poor by providing cash to buffer the risk associated with drought and other hazards. The interpretation of the odds ratio implies that, if other factors are held constant, the probability of being poor in the non-income dimension decreases by a factor of 0.0001 as the household is able to generate 100

Birr in a week time. However, as the standard error 89.84 is high this finding should be handled in cautious.

Number of household assets owned by the household (HH_ASSET): this variable represents the number of household assets owned by the household which are taken from the list on the questionnaire. The regression output indicates that this variable has negative association with the household non-income poverty and significant at the probability level of 5%. The result shows that possession of household assets like radio, watches/clocks/, agricultural implements like plough, etc in rural areas becomes an important determinant of non-income poverty. The negative correlation means that higher ownership of household assets results in lower probability of the members of cooperatives to fall in non-income poverty. Furthermore, the odds ratio of 0.618 for this variable implies that, other things being constant, the probability of being poor in the non-income dimension decreases by a factor of 0.618 as the number of household asset increases by one unit. The probable reason is that good possession of household assets like radio, watches/clocks/, agricultural implements like plough, … etc would indicate in a higher source of income to be educated, healthy, etc. implying an increase home food production, eminently showing the coming out of the non-income poverty.

Nutritional status of members of the household: malnutrition is common problem in Ethiopia which destroys the physical and mental capability of an individual and influencing the non-income dimension of poverty status of households of members of cooperatives. Household members with body mass index of greater or equal to 18.5 (NUTRITIO) are not considered to be under malnutrition. The model results show that nutrition has a negative association with the non-income dimension of household poverty and it is significant at a probability level of less than 5%. That is, the non-income dimension of poverty level of members of cooperatives in rural central zone may get reduced if they are well nutritional by the required diet to be healthy. The odds ratio indicated that, other things being constant, the probability of the households to be poor in the non-income dimension increases by a factor of 0.290 as the body mass index of members of household decreases by 1 unit. Conversely, this means the probability of the household to be poor in the non-income dimension diminishes by a factor of 0.290 as the household body mass index increases by 1 unit.

The above relation indicates that access to nutritious food will be important in order to reduce the non-income dimension of poverty of members of cooperatives in rural central zone. This indicates there should be a mechanism to create a change in the food consumption behavior of the members of cooperatives in the study area to enhance the capability and normal body growth of an individual.

Getting services from a cooperative (COOPERAT): the variable is found to have negative correlation with households of members of cooperatives non-income dimension of poverty status and it is significant at less than 1% probability level. This variable is analyzed based on the responses of the respondents on whether or not they get services from their association. Accordingly, the result shows that the probability of the households of members of cooperatives in rural areas of central zone of Tigray falling into the non-income dimension of poverty increases as they fail to get services from their association. It means that the probability of being poor in the non-income dimension reduces as services obtained by the households of members of cooperatives from their association increases. Similarly, the odds ratio of 0.195 for services obtained from cooperatives implies that, other things being constant, the probability of being poor in the non-income dimension increases by a factor of 0.195 as the services obtained from cooperatives by the rural households becomes rampant.

The most probable reason might be that households of the study area do not have full knowledge of what is happening within their association. Those who do not make active participation in their cooperative movement and/or unable to fulfill their duties and responsibilities may face problem and which in turn aggravates the non-income dimension of poverty.

In sum, the result of the logistic regression model revealed that among other determinants number of livestock owned (LIVESTOC), the ability of the HH head to read & write (RE_WR), health status of the household (HEALTH), copping mechanism in times of emergency (COPPING) (with high standard error), number of household assets owned by the household (HH_ASSET), body mass index of the HH members greater or equal to 18.5 (NUTRITIO) and getting services from a cooperative (COOPERAT) were found out to have coefficients with expected sign and has significant impact on the household non-income dimension of poverty status (see table 4.65). Where as, the rest 2 explanatory variables, family size per household (FAMLYSIZ) and dependency ratio (DEPENDEN) (see table 4.65) were found to have coefficients different from the expected one.

5. Summary, Conclusion and Recommendations

5.1 Limitations

The survey has dealt with a limited number of households and focused on the non-income dimension of poverty at household level but did not include intra-household dimension. Data on Gross and Net Enrollment, School Dropout, Repetition Rates, Facilities and Amenities, Malnutrition status of Children, BMI for Adults and Data on DGH are collected and analyzed.

Apart from highlighting some advantages of extending poverty to non-income dimensions, it is also important to mention some of the problems. Probably the most important drawback is that it would not yield new useful information, as many non-income dimensions of wellbeing do not change much over time. Moreover, change in some non-income measures generally means improvement, at least in the way it is measured. The most extreme example of this would be to use the years of schooling to track education poverty of adults. This indicator is likely to stay the same for the vast majority of adults once they leave the educational system and if it changes, it will only go up, but never down (as surveys usually track only educational improvements, but not the loss of knowledge/ skills over time). But the suggestion in these non-income measures is that many people in many developing countries are deprived of critical functionings and these non-income measures adequately reflect the functioning shortfall in question. For example, adults (many of whom are female) in developing countries who never had the opportunity to be schooled will be educational poor. This might be an obvious statement, but from a wellbeing perspective we occasionally need to be reminded that attempts to achieve universal enrolment for children will do nothing to combat education poverty among adults.

The second drawback is that in measuring non-income poverty, several new conceptual questions arise. For example, what is education and health poverty among children? How does one define such poverty? Is an individual education poor only if he/she is not in school? Or is the individual also education poor if he/she is lagging behind in progressing through school? Or what if his performance is deteriorating? Similarly, is stunting already an indicator of poverty since it is related to lower-than-required energy intake. Clearly, these are serious questions but here, too, there is need for more work in extending the concept of poverty to these issues rather than abandon the effort.

5.2 Summary

The study was conducted in the 4 Woredas (Ahferom, Naedier-adet, Werie-leke and Qola-temben) of Central zone of Tigray National Regional State. It focused on the rural households of members of cooperatives who are predominantly engaged in agriculture. The major objectives of this study were to explore the non-income dimensions and determinants of poverty in the rural households of Northern Ethiopia and examine the determining factors of the state of non-income poverty at micro-level. To this end, identifying poor and non-poor households, investigation of demographic and socio-economic characteristics of households of members of cooperatives and measurement of the non-income dimensions of poverty have been made.

This study made use of the primary data collected by the researcher through conducting formal household survey. The research period covered duration of nearly one year from July 2007 to April 2008. A two stage systematic random sampling procedure was followed. In the first stage, 10 sample cooperatives were selected from the 4 Woredas and in the second stage 20 households of members of cooperatives were selected using systematic random sampling method from each randomly selected cooperative. Primary data were collected from sample respondents through direct interview using structured schedule. Furthermore, the survey was supplemented by secondary data from Tigray Region Education Bureau, Central Zone Administration Office and Health, Education and Water & Mining Offices of the respective Woredas in the survey area. The data collected were presented, organized and discussed using descriptive statistics and econometric model analyses. In the first stage, attempts were made to explore data and information pertaining to the general set of sample households of members of cooperatives and the raw data were organized and discussed using descriptive statistics and logit regression models. Therefore, the summary of the main results is as follows.

Households of members of cooperatives were arbitrarily categorized into poor and non-poor for convenience based on the results obtained from this survey on annual expenditure of households on consumption and non-consumption items and comparing the results against the poverty line for the region. The poverty line for rural Tigray according to the HICE survey of 1995/6 conducted by CSA was found to be birr 1,176.066 of which food expenditure accounts birr 753.054 and non-food expenditure accounting birr 423.012. Taking constant price at 1995/96

when adjusted to 2008, the total poverty line for rural Tigray was found to be Birr 1938.69 with food expenditure Birr 1,335.58 and non-food expenditure accounting Birr 603.10.

Therefore, comparing the non-food expenditure component calculated from the data available against the results of non-food expenditure component deflated to 2008 for rural Tigray, 47 sample households (27%) were poor and 127 sample households (73%) were found to be non-poor.

The result of the logistic regression model revealed that among the 18 variables considered in the model, 9 explanatory variables are found to be significant up to less than 10% probability level. Accordingly, getting services from cooperatives (significant at less than 1%), dependency ratio, number of livestock owned, health status of household members, number of household assets owned by the household and body mass index of household members greater than or equal to 18.5 (significant at less than 5% level), and family size, ability of the household head to read and write and copping mechanism of the household in times of emergency (significant at less then 10%) were found out to have strong negative correlation with the households non-income poverty status.

Members of cooperatives in rural central zone have suffered from frequent disasters originated from drought, famine, lack of infrastructures, war, inaccessibility to market, lack of education and health facilities and the like. The climatic shock emanating from drought is only one of many sources of risks faced by all rural households in the region. Land degradation and high population density in relation to the small holding per household coupled with low productivity had particularly deleterious effect on members of cooperatives in rural areas of central zone of Tigray, who have also been affected by the Ethio-eritrean war for the last 10 years. Production of high value added products has neither flourished nor integrated with market in the area while ground water resource is not adequate to increase production through irrigation schemes in the area. Although no livestock losses incidence has occurred in the area, it cannot be concluded that this is because of effective animal health care is well institutionalized in the area.

The border conflict with Eritrea is another vulnerability factor that affects the livelihood of the members of cooperatives and resulted in the socio-economic breakdown of the households. The war with Eritrea resulted in not only substantial loss of human beings and household assets but also made the movement of cooperatives in the area to be rampant.

It has been observed that the dimensions and causes of non-income poverty are vast and complex. Non-income poverty affects people of different characteristics in different ways, because they play different roles, have different needs and face different constraints and opportunities. It is most likely that households under non-income poverty such as inaccessibility of social services ultimately fall under the income dimension of poverty. Proper understanding of these conditions is an essential starting point and is a key to the formulation of policies, designing appropriate strategies and practical steps that the government can take in order to reduce and promote sustainable growth at macro, meso and micro levels.

5.3 Conclusion and Recommendation

A broad perspective on the problems of non-income poverty allows us to examine their multiple factors contributing to members of cooperatives in the rural area. The difficulties and complexities of the life situations call for multifaceted and broad view of support. Since no one factor propels members of cooperatives in the rural area into non-income poverty, concrete action oriented programs and plans are needed to change their lives.

The main obstacle to attend normal education according to the results of the survey is parents do not let attend their children. Although, economic problem for not attending school is not found to be significant it has become the main reason for dropping out from schools to be involved in other jobs. Therefore, much work has to be done in creating mechanism for supporting parents to make their children stay at school. Especially, gender bias in favor of male is revealed as the grade level increases including repetition rates. This requires helping female students in secondary schools to enhance their participation as well as performance by all concerned stakeholders working in this area. Regarding educational attainment the majority of the population has attained the primary school (i.e. 1-8) and also the ratio of pupil to section increases as the grade level increases, hence from now on wards, the government's focus should be on lower and higher secondary schools, i.e. on the grades 9-10 and 11-12, respectively. According to the survey result, significant number of the sampled population is still out of school. Therefore, due consideration should be given for adult education as is given to normal school education.

The problem of 'shortage of drugs' in the rural central zone in particular and in Tigray in general has become a persisting problem over the last 4 years which requires due attention to be given by

policy makers. Prevalence of malnutrition in the study area is on the higher side. Therefore, bureau of health and other concerned bodies should work in changing the consumption behavior of the society. Assistance of mothers during delivery by health professionals is still on its lowest stage requiring attention by the authorized bodies.

The changes in educational and societal arenas can facilitate the effort of the households to enhance their opportunities. Policies that capture the broad perspective and that can mobilize and direct the effort of a variety of institutions are needed. The narrow approach doesn't address the problem of households in the rural area. So government, non-governmental organizations and the UN agencies as well as concerned civil societies need to work together to improve the lives of members of cooperatives in the rural areas.

Efforts have been made to provide basic social services such as education and health. These services are important in increasing human capital and vital in changing the lives of the poor. Focused government policies need to be designed to reduce poverty by taking into account the capabilities of the households and the environment they are living in. Strong social sector programs that will take the capability system of the vulnerable groups into account, the households will strengthen human capabilities resulting in non-income poverty reduction. Policies of different sectors need to focus on the specific needs of households and they have to be implemented with focus on the capabilities differentiations.

All of the rural households in the survey area use collected wood for cooking over the past five years prior to the survey period. This obviously has a negative impact on the environment and land degradation in addition to the time and energy spent on by women and girls for collection which needs intervention.

The exhibition of a decreasing trend in proportions of HHs exposed to unsafe water could possibly be a reflection of the government's work on it. However, the distribution of the beneficiaries to unsafe water is found to be biased from one Tabia to the other because of unavailability of adequate ground water. This situation should be taken into account while addressing such people living in low ground water areas.

Better water access improves productivity. There is a dire need to strengthen community managed water supply and increase water source accessibility to human and livestock populations in rural areas. Also environmental protection should be considered seriously with careful analysis in using the available natural resources and their management.

The households of members of cooperatives in the area use free grazing in feeding their cattle and shoats. Poor management of grazing resulted inability of the households of members of cooperatives to get the required product they deserve from their animals which contributes in aggravating non-income poverty in the area. Proper and controlled grazing systems are very important in improving the capabilities of households in the area. Therefore, the introduction of zero-grazing system for sustainable use of the resources and improve the wellbeing of the members of cooperatives is vital.

The survey result has indicated that significant number of households did not own two oxen minimum number required to till their land, therefore, the concerned bodies are required to help households in need of oxen to till their land by their own oxen. There is a trend in the decrease of shoats and poultry in the study area where attention is required by the ARDB as the area is suitable for the breeding of such animals.

The changes over the past five years on toilet facility and waste disposal especially on using pit latrine and using garbage as manure are very impressing which should be kept as habit for the coming generation.

According to the survey results micro-finance and telecommunication services are reported to have the highest percentage of improvement over the 12 months prior to the survey period followed by agricultural input services. However, the services provided by police station and health centre are found to require attention for improvement.

The survey result indicated that 'aid' as a solution for food shortage is not a scenario in the study area while safety net program is becoming an alternative solution which definitely has a contribution on sustainable development. However, insufficiency of own crop production in feeding the household is still unsolved homework of the institutions working in this area directly or indirectly. A good focus on the resilience and vulnerability to shocks is given to improve the effectiveness of emergency preparedness, response and development strategies. Food aid alone has not been and cannot be sufficient for combating the multifaceted nature of emergency occurred in rural areas. Only multiple strategies of development interventions like the safety net programs will address adequately such vulnerabilities.

Although the survey findings show that significant number of members of cooperatives buy goods from their association, almost non of the households sale their products to same. Hence, strengthening of the associations in the study area is a question of the time as the majority of the

members of cooperatives have explicitly explained that they are benefited by being a member of that cooperative.

Development intervention strategies are needed in order to enable immediate survival during emergency times as well as to promote disaster recovery and increase shock absorbing capacity of the rural households. Interventions must be designed based on an analysis and understanding of the characteristics and dynamics of local context specific needs and should be oriented towards supporting household assets as well as to the diverse policies, institutions and processes that impact vulnerable households.

Poverty reduction strategies need to target specific groups of societies like the marginalized rural people and careful analysis will be required to see who is benefited and what the benefit is. The strategy should have a needs identification to address both the basic needs as well as the needs that arise from the households specific constraints. This requires the inclusion of the rural households' views and needs during the planning process if the condition of the people in the rural areas is to be changed. Mechanisms are needed to ensure that the concerns of the rural people are reflected in public policies and required to bring these groups into very center of policy making process.

Evidence is mounting that government programs work better when they seek the participation of potential users, and when they tap the community's reservoir of social capital rather than working against it. The benefits show up in smoother implementation, greater sustainability and better feedback to government agencies.

The Poverty Reduction Strategic Paper (PRSP) is the most current government paper on tackling poverty, yet its practical impact in rural development remains minimal. The strategy should focus and emphases on improving the welfare of the rural people by increasing productivity and minimizing risk through infrastructure development, improved market access and other support services that are rudimentary in their life. Given the comparative advantage of the area, interventions revolving around production of poultry, cattle, bees and production of high value added products are considered as appropriate point of entry with due regard to risk management.

Large family size and dependency are not found to be as one of the key factors that drive the population to non-income poverty. However, this does not mean that the already endorsed programs under implementation and the existing population policy should not be put into effect. A focus on family planning and integrated health service and education provisions must catch the

attention of decision-making bodies because children under the dependent age group are engaged in economic activities to help themselves and their families.

Lastly, the capability of many households in the zone was low and is seriously affected by the repeated and recurrent drought. Thus, the safety net program seems imperative to continue to keep alive those who have no access either to produce or buy food. But in helping people to help themselves, the link with income generating activities would help both in reducing dependency syndrome and contributing to local development by creating massive self-employment in the area.

Implications for Future Research:

1. The research work was done in rural central zone of Tigray region only. It will be worthwhile to study the income and non-income dimensions and determinants of poverty of members of cooperatives in the western zone of Tigray region.
2. It will also be worthwhile to conduct an empirical study on the extent of poverty in the Afar region of Ethiopia and its determinants.

7. References:

Abraha Kinfe (Ast. Prof, MU), Tesfay Abreha (Lecturer, MU), G/Michael Ametemariam (Women's Affairs Bureau, Tigray), Alemayehu Habtu (Lecturer, MU), and Assefa Azeb (Assistant Lecturer, MU) (August, 2007). Enhancing the Participation of Females in the Educational System of Ethiopia: A Case of Tigray.

Boyes, Kelvin, *Text book of Economics (Sixth edition). Indian* Adaptation.

Coudouel A., Hentschel J., and Wodon Q., *Well-being measurement and analysis,* Draft for comments, (April, 2001).

CSA. (1995/96 & 2004/5). *Household Income, consumption and expenditure (HICE) survey.*

CSA. (May 2007). *Household Income, consumption and expenditure (HICE) survey, Volume I,.*

CSA. (2000 & 2005). *Demographic and Health Survey*.

CSA. (1994). *Population and Housing Census of Ethiopia.*

CSA, (2006). *Statistical Abstract.*

CSA.(2004). *Welfare monitoring survey.*

Feder, G., Just, R.E., and Ziberman, D. 1985. Adoption of Agricultural Innovation in Developing Countries: A survey World Bank Staff Working Papers, No. 542. Washington D.C.

FAO (1997). Managing Anti-poverty programs. In rural development international workshop, ANNCY HART (ed.). pp.27-35. Rome: FAO.

FAO (2001). Food, Agricultural and Rural Development. Current and Emerging issues for Economic Analysis and Policy Research, Economic and Social Department, (ed.) Stamoulis, K.G. FAO: Rome

Foster, Greer and Thorbecke, (1894). A Class of Decomposable Poverty Measures. Econometrica, Vol. 52.

Gujarati, D.N. 1988. Basic Econometrics. Second Edition. McGraw-Hill, Inc., New York.

Gujarati, D.N. 1995. Basic Econometrics. Third Edition. McGraw-Hill, Inc., New York.

Hosmer, D.W., and Lemeshow, S. 1989. Applied Logistic Regression. A Wiley-Inter science publication, New York.

Hulme, D. and Mckay, A. (2005) Identifying and understanding chronic poverty: beyond income measures. Manchester: Chronic Poverty Research Centre.

Isabel Gunther and Stephan Klasen. (May 2007). *Measuring Chronic Non-income poverty.*

Klasen, S. (2000) Measuring Poverty and Deprivation in South Africa. Review of Imcome and Wealth, **46**: 33-38.

Klasen, S. (2005) Economic growth and poverty reduction: measurement and policy issues. OECD Development Centre Working Paper 246. Paris: OECD.

Klasen, S. (2007a) Gender-related indicators of wellbeing. In McGillivray, M. (Ed.) Human Well-Being: Concept and Measurement. London: Palgrave, pp 167-192.

Klasen, S. (2007b) Poverty, under-nutrition, and child mortality: Some inter-regional puzzles and their implications for research and policy. Journal of Economic Inequality (forthcoming).

Liao, T.F. 1994. Interpreting Probability Models: logit, probit and Other Generalized Models. Sage University Paper Series on Qualitative Applications in the Social Sciences, 07-101. Thousand Oaks, CA: Sage, California.

Mikrie Hilina. (April 2005). *Dimensions and determinants of poverty in pastoral areas of eastern Ethiopia: The case of Shinile zone in Somali National State, Alemaya University.*

Ministry of Finance and Economic Development, (2002) *Development and Poverty Profile of Ethiopia.*

Muluken Yilma. (January 2005). *Measuring rural household food security status and its determinants in the Benshangul Gumuz Region, Ethiopia: The case of Assosa Woreda, Alemaya University.*

Nega Berhanu.Phd. (2004). *unpublished essay on measuring democracy, good governance and human rights.*

Pindyck, Robert S. and Rubinfeld, Daniel L. 1981. Econometric Models and Economic Forecasts. 2nd Edition, McGraw-Hill Book Co. New York.

Rahmato Dessalegn, Monograph Series 2/92, *The dynamics of Rural Poverty: Case Studies from a District in Southern Ethiopia.*

Roger Riddell. (2004). *Approaches to poverty, A Note from the "Development" Perspective, International Council on Human Rights Policy.*

Sen, A. (1985) The standard of living. Cambridge: Cambridge University Press.

Sen, A. (1999) Development as Freedom. Oxford: Oxford University Press.

Tefera Mulugeta. (April 2002). *Determinants of Household Food Security in eastern Oromia, Ethiopia: The case of Boke District of Western Hararghe zone.*

UNICEF (1998). The state of World's Children: Focus on Nutrition. New York: UNICEF.

World Bank, (2000a). The World Bank Partnerships for Development Published by creative Communicates Group for the World Babk.

www.un.org/esa/socdev/poverty/subpages/coop_panel.htm

Zenasilassie Siyum, *Absolute Poverty Line and Adult Equivalent Scales*. Unpublished Document.

7. APPENDICES

Annex I: Population & Number of Multi-purpose Primary Cooperatives in Tigray

Ser No.	Woreda Name	Number of Cooperatives	Population	Comments
A	Southern Zone	118	1,275,790	
1	Enderta	17	148,449	
2	Saharti-samre	18	121,416	
3	Hintalo-wajirat	15	154,187	
4	Emba-alaje	14	115,732	
5	Enda-mehoni	14	119,701	
6	Ofla	14	175,815	
7	Alamata	11	141,554	
8	Raya-azebo	15	121,846	
B	Eastern Zone	110	828,983	
1	Wukro	15	124,743	
2	Atsbi-wenberta	16	116,632	
3	S/Tsaeda-emba	12	141,733	
4	G/Afeshum	21	184,420	
5	Hawzen	22	127,547	
6	Gulo-mekeda	17	109,712	
7	Erob	7	24,196	
C	Central Zone	191	1,315,059	
1	Degua Temben	16	121,785	
2	Qola Temben	24	157,427	
3	Tanqua Abergele	14	79,765	
4	Werie-leke	26	151,212	
5	Adua	16	158772	
6	L/Maichew	14	134,766	
7	T/Maichew	16	108,389	
8	Naedier-adet	18	115,001	
9	Ahferom	25	180,315	
10	Mereb-leke	22	107,627	
D	Western Zone	159	1,029,165	
1	Medebay zana	16	133,994	
2	T/Qoraro	13	124,802	
3	A/Tsimbla	19	132,811	
4	Tselemti	18	134,031	
5	T/Adiyabo	14	115,122	
6	L/Adiyabo	19	110,339	
7	Qafta-Humera	25	73,682	
8	Welkayt	15	123,666	
9	Tsegede	20	80,718	
E	Mekelle	11	177,090	
F	**Total of Totals**	**589**	**4,448,997**	

Source: Cooperative Promotion and Registration Office and Statistical Abstract of CSA, 2006.

Annex II: List of Multi-purpose Primary Cooperatives in the Selected Weredas

	Name of the Wereda	Name of the Coops.	Legal Date	Organ. Type	Systematic Random Sampling			Number of Members		
					Rand. Interval	Random Start	Status of Selection	M	F	T
A	Qola Temben				12	4		9908	1882	11979
1		Fire	7/7/1989	85/86				607	614	1221
2		Debre-tsehay	---	85/86				258	40	298
3		Kokob	---	85/86				646	231	897
4		Shewit	7/7/1989	85/86			√	672	12	684
5		Wihdet	20/6/89	85/86				359	106	465
6		Werk-abeba	13/9/90	85/86				613	22	793
7		Selam	10/6/1989	85/86				464	129	593
8		Lemlem Begashika	24/1/97	85/86				456	114	570
9		Limeat	24/1/97	85/86				587	61	648
10		Lemlem	17/10/91	85/86				328	31	358
11		Semhal	17/10/91	85/86				186	32	218
12		Ruba Lemin	17/10/91	85/86				600	50	658
13		Fire Lekatit	1/9/1990	85/86				440	53	493
14		Timke Tekeze	24/1/97	85/86				456	18	474
15		Dedebit	17/10/91	85/86				426	15	441
16		Guna	2/8/1992	85/86			√	700	50	750
17		Werie	3/9/1992	85/86				298	40	338
18		Qertse Mera	3/9/1992	85/86				397	58	455
19		Walta	23/9/92	85/86				502	63	565
20		Hintset	22/3/94	85/86				384	54	438
21		Enba-niwi	11/8/1993	85/86				330	69	399
22		Fire selam	10/7/1993	85/86				173	20	193
23		May lomin	15/02/94	85/86				18		18
24		Tsilal	17/11/95	85/86				8		12

B	Werie-leke				8	4				
1		Kokeb-tsibah	15/7/95					759	142	901
2		Simret	16/11/89	138/70				516	226	742
3		Fire-qalsi	16/5/92					589	66	655
4		May semhal	13/9/90				√	508	135	643
5		W/Tsa/Erarbo	25/7/92					154	10	164
6		Shewit	15/7/95					480	67	547
7		Tsinat	---					15		15
8		Aynalem	16/11/89					538	200	738
9		Flifil etot	16/7/89	138/70				509	54	683
10		Selam bqalsi	23/7/92	138/70				454	212	666
11		Hawelti	25/7/92	138/70				435	89	524
12		Selam	13/9/90	138/70			√	605	702	678
13		Wihdet	15/5/90					402	19	421
14		Maebel	2/11/1991					258	50	308
15		Biherawi	19/10/89	138/70				79	482	561
16		Lemlem	28/5/90	138/70				146	5	151
17		Gebru wesihun	29/2/92	138/70				267	244	508
18		Senay timnit	25/7/92	138/70				274	65	339
19		Fire siwi-at	25/7/92	138/70				256	12	268
20		Dedebit	4/10/1992	138/70			√	347	73	676
21		Masho	5/12/1989	138/70				639	37	676
22		Midinfa'e Ma-etot	13/11/96					276	28	304
23		Lim-at	13/11/96					200	33	233
24		Arena	24/1/93	138/70				217	16	233
25		Hayelom	8/9/1992	138/70				17	118	135
26		Musie	8/5/1995					16		16

C	Ahferom				8	8		10076	3224	13298
1		E/Birhan	1990	85/86				913	159	1072
2		M/Suru	1990	85/86				676	149	825
3		Degoz	14/11/96	85/86				374	72	446
4		Ta/M/Tsilari	1990	85/86				526	108	634
5		Fire Lekatit	14/11/96	85/86				428	81	509
6		Senay	23/7/92	85/86				696	109	805
7		Bet gobez	6/9/1994	85/86				306	15	321
8		May hamay	13/9/90	85/86			√	400	224	624
9		Selam	1990	85/86				298	35	333
10		Semhal	1/7/1992	85/86				167	113	280
11		Gerhu senay	18/2/95	85/86				157	97	254
12		Zban gule	24/10/94	85/86				141	32	173
13		Segen	14/11/96	85/86				458	80	538
14		Shewit	14/11/96	85/86				513	557	1070
15		Fire-Siweat	23/9/92	85/86				513	140	653
16		D/Anbesa	23/7/92	85/86			√	280	85	365
17		Lim-at	30/7/90	85/86				404	154	558
18		Simret	14/11/96	85/86				423	224	647
19		Lemlem	30/7/90	85/86				306	86	392
20		Fire-semay	4/3/1993	85/86				175	93	266
21		A/Bereto	25/7/92	85/86				419	127	546
22		Mishig	1/1/1991	85/86				664	251	915
23		Emba ahferom	1990	85/86				333	87	420
24		Sif'o	23/9/92	85/86			√	323	75	398
25		Kuda	23/9/92	85/86				183	71	254

D	Naedier-adet				8	8				
1		Selam	17/10/91	85/86				246	140	386
2		Maydanya	1989	85/86				200	133	333
3		A/Beqli	1990	85/86				301	44	343
4		D/Genet	29/2/97	85/86				101	56	157
5		Hemer	11/8/1993	85/86				182	26	208
6		Daero hafash	29/2/97	85/86				228	88	316
7		Ma/Wihdet	1991	85/86				531	169	700
8		Fire qalsi	29/2/97	85/86			√	258	51	269
9		Abeba yohans	14/6/92	85/86				225	18	243
10		Adi Lekiyen	11/8/1993	85/86				92	11	103
11		Kisad momona	1990	85/86				233	39	272
12		Walta		85/86				306	39	345
13		Shewit	1991	85/86				244	48	292
14		Wihdet	1990					746	128	874
15		Robay	24/12/97					91	21	112
16		Lemlem	1/6/1998				√	25	30	55
17		Genet	1/7/1998					97	7	104
18		Werie	2/9/1998					154		154
19	4 Weredas						10 Coops			------- Population

Source: Data obtained from Regional and Woreda Cooperatives Promotion Bureaus.

Annex III: Interview Schedule

Mekelle University

Form 1

School of Post-Graduate Studies

Schedule for

Household Survey on Non-income Dimensions and Determinants of poverty

Section – 1 IDENTIFICATION PARTICULARS

1	2	3	4 Agricultural Holding	5	6	7. Name of Head of Household
Zone	Woreda	Tabia	Yes = 1, No =2	Order of Selection	H/H Size	

Section – 2 Economic and Demographic Characteristics of all Household Members

8	9	10	11	12	13	14	15	16	17	18
For all Household Members						Ask members aged 10 years and over				
Serial Number	Name of Members of Household (in listing order specified in your manual)	Relation to head of household	Sex M=1 F=2	Age in years	Religion	Marital Status	Were you engaged in productive work during the last 12 months? If Yes = 1, Skip to column 17 No = 2	If code 2 in column 15, reason for not working	Employment Status	What was your main occupation in the last 12 months?
1										
2										
3										
4										
5										
6										
7										

- Column 13: 1 = Orthodox
  2 = Protestant
  3 = Catholic
  4 = Muslim
  5 = Traditional
  6 = Other

Column 14: 1 = Never married
2 = Married
3 = Divorced
4 = Widowed
5 = Separated

Column 17: 1 = Employer
2 = Self-employed
3 = Employed, private
4 = Gov't employee
5 = NGO's employee
6 = Employed, cooperative
7 = Unpaid family worker
8 = Others

Form 2

Section – 3 Educational Status (For all household members 5 years and over)

19	20	21	22	23	24	25	26	27	28				
							If code 1 in column 25						
Serial Number (transfer from form 1)	List of Household members aged 5 years and over (transfer from form 1)	Can (NAME) read and write? Yes = 1 No = 2	Has (NAME) ever attended school? (formal education) If Yes = 1, skip to column 24 No = 2	What is the main reason for not attending school? (select from the choices below)	What is the highest grade completed? (Refer to education code)	Has (NAME) currently registered to attend school? Yes = 1 No = 2	If currently registered which grade?	What type of school is it?	What is the main problem of your school? Yes =1 No = 2				
									S/ books	L/ teacher	C/ Crowd	L/ facility	Others

- Column 23: 1 = Need to work
  2 = Family not willing
  3 = Too expensive
  4 = No school around
  5 = Marriage
  6 = Illness
  7 = Do not know the value of education
  8 = Under School age
  9 = Too old to go to school
  10 = Disabled
  11 = Other

Column 24: 0 = Illiterate
1 = Can read and write
2 = Grade 1 - 4
3 = Grade 5 - 8
4 = Grade 9 - 10
5 = Grade 11-12
6 = Certificate and diploma
7 = Degree and above

Column 28: S/ = Shortage of
L/ = Lack of
C/ = Class

Form 2

… Section – 3 Educational Status (For all household members 5 years and over)

29	30	31	32	33	34	35
Serial Number (transfer from form 1)	List of Household members aged 5 years and over (transfer from form 1)	Has (NAME) registered to attend school last year? (formal education) Yes = 1 No = 2	If registered last year which grade?	If registered Did NAME took final exam last year? Yes = 1 If No = 2, skip to column 35	If (NAME) took final exam last year did he/she pass the exam? Yes = 1 No = 2	Reason for not completing? Need to work = 1 Too expensive = 2 Lack of books = 3 School too far = 4 Failed in exam = 5 Married = 6 Sickness = 7 Others = 8

Form 3

Section – 4 Health (For all household members)

36	37	38	39	40	41	42	43
		Has (NAME) faced any health problem during the last 2 months? Yes = 1 If No = 2, go to column 41	If code 1 in column 38		Has (NAME) consulted any health institution during the last 2 months? Yes = 1 If No =2, skip to column 47	If code 1 in column 41	
Serial Number (transfer from form 1)	List of Household Members		What sort of sickness?	For how many days were you absent from your usual activity during the last 2 months?		If yes, from where?	Have you faced any problem with the health institution visited? Yes =1 If No =2 skip to column 48

- For Column 39: 1 = Malaria
  2 = Diarrhea
  3 = Injury
  4 = Dental
  5 = Opthalmic
  6 = Skin disease
  7 = Ear /Nose
  8 = Tuberclousis
  9 = Others

For question Number 42:
1 = Traditional healer
2 = Gov't Hospital
3 = Gov't Health Centre
4 = Gov't Health post
5 = Private Health Institution
6 = Mission (NGO)
7 = Private Health Personnel
8 = Pharmacy
9 = Others

… Section – 4 Health (For all household members)

44	45	46									47	48	49	50
Serial Number (transfer from form 1)	List of Household Members	If code 1 in column 43									If code 2 in col. 41	How many times have you consulted medical assistance during the last 12 months?	For women 15 years and over	
		What was the problem encountered in the health institution? Yes = 1 No = 2									Why didn't you consult with health institutions/ traditional healer during the last 2 months?		Has (NAME) been pregnant over the last 12 months? Yes = 1 No = 2	If code 1 in col. 49
		Institution Not Hygienic	Long waiting time	Shortage of health Professi	Service charge too Expensiv	Shortage of Medicine	Lack of laboratory	Staff not cooperative	Shortage medical equipment	Others				Has (NAME) received pre-natal care during the last 12 months? Yes = 1 No = 2

Column 47: No need to consult = 1
Financial incapability = 2
Expensive service = 3
Service too far = 4
In-confident with quality level of the institution = 5
Do not believe in medical treatment at all = 6
Lack of qualified health personnel = 7
Poor service equipment = 8
Others = 9

Form 4

Section 5 Anthropometry, Immunization and Child care (Under 5 children)

51	52	53	54	55	56	57	58			
				From column 55 – 58 ask for children aged 0 -59 months						
Serial Number of child (transfer from form 1)	List of children under 5 years of age (transfer from form 1section 2 column 9)	Serial number of natural mother? (transfer from form 1) If the mother is not member of the household enter 0	How old is the child (in months)	Where was the child born? Hospit = 1 Clinic = 2 Health cen =3 Health post=4 At home = 5 Other = 6 Don't kn = 7	Who assisted during delivery? Medical person. = 1 Delivery nurse= 2 Trai TBA = 3 TBA (N Trained) = 4 Self assiste = 5 Don't kno = 6 Other = 7	Do you have child immunization card with you? Yes = 1 Lost = 2 Kept in health institution =3 No card = 4	Is the child immunized against each? Yes = 1 No = 2				
								Measles	BCG	DPT	Polio

Form 4

…. Section 5 Anthropometry, Immunization and Child care (Under 5 children)

59	60	61	62			63	64					65		
		From column 61 – 63 ask for children aged 0 -59 months					For children 3 – 59 months							
Serial Number of child (transfer from form 1)	List of children under 5 years of age (transfer from form 1section 2 column 9)	How many times has the child ever taken Vitamin A doses?	Was the child sick of diarrhea, Fever or Cough during the last two weeks? Yes = 1 No = 2			If the child was sick of diarrhea, how did you assist the child? Given clinical ORS = 1 Given home made ORS = 2 Given other fluids = 3 Consulted modern health institution = 4 Treated traditionally = 5 Not assisted = 6	Weight (in Grams)					Height (in cm.)		
			Sick of Diarrhea	Sick of Fever	Sick of Cough									

Form 5

Section 6 Housing Amenities

66	67	68	69	70	71	72	73	74
Ser. No.	Does this household exist 12 months ago? Yes = 1 No = 2	How long has this household been living in this dwelling unit?	On what basis does the household occupy the dwelling unit? Owned = 1 Free from employer = 2 Free from relative =3 Rented from cooper.= 4 Rented = 5 Others = 6	How many rooms does it have? Exclude kitchen and toilet	Main construction material of the wall? Wood & mud = 1 Wood & grass = 2 Mud & stone = 3 Cement & stone = 4 Bricks = 5 Others =6	Main construction material of the roof? Corrugated iron sheets = 1 Thatch and grass = 2 Wood and mud = 3 Others = 4	What is the main source of light? Kerosine = 1 Electricity = 2 Firewood = 3 Others =4	What is the main source of cooking fuel? Collected firewood =1 Purchased firewood = 2 Charcoal = 3 Kerosine = 4 Electricity = 5 Crop residue = 6 Others = 7
1	[redacted]	Year Month	Now	Now	Now	Now	Now	Now
2	[redacted]		12 mo. ago	[redacted]	[redacted]	[redacted]	12 mo. ago	12 mo. ago
3	[redacted]		5 years ago	[redacted]	[redacted]	[redacted]	5 years ago	5 years ago

Form 5

… Section 6 Housing Amenities

75	76		77		78		79		80	
Ser. No.	What is the main source of drinking water in rainy season? Tap in a compound = 1 Tap outside the compound = 2 Protected wellspring = 3 Unprotected wellspring = 4 River, lake, pond = 5 Rainwater = 6		What is the main source of drinking water in dry season? Tap in a compound = 1 Tap outside the compound = 2 Protected wellspring = 3 Unprotected wellspring = 4 River, lake, pond = 5		Does the household have a habit of boiling water before drinking? Yes = 1 No = 2		What type of toilet facility does the household use? Flush toilet = 1 Pit latrine Private = 2 Pit latrine shared = 3 Field/ forest = 4 Others = 5		What type of waste disposal facility does the household use? Use container = 1 Uses dug-outs = 2 Throw away = 3 Use as fertilizer = 4 Burning the waste = 5 Others = 6	
1	Now		Now		Now		Now		Now	
2	12 months ago		12 months ago		12 months ago		12 months ago		12 mon. ago	
3	5 years ago		5 years ago		5 years ago		5 years ago		5 year ago	

Form 6

Section 7 Access and Utilization of Basic Facilities

81	82	83							84	85							86	87	88
		How far is the nearest facility? (If the distance is less than a k.m enter '0')								If code 1 or 2 in column 84, what is the main reason for non-use or occasional use of the facility? Yes = 1 No = 2							If the household utilizes the service (If code 2, 3 and 4 in column 84)		
Ser No.	Type of facility	Kilo Meter			Hours		Minutes		To what extent does the household use this facility? Ask for each Do not use at all = 1 Use occasionally = 2 Use often = 3 Use always = 4	Too far away	Too expensive	Poor service	No staff or Equipment	Inadequate facilities	No need of that facility	Other	Are you satisfied with the service? Yes = 1 No = 2 Do not know = 3	How is the service quality as compared with 12 months ago? Worse now = 1 Same = 2 Better now = 3 Do not know = 4	What mode of transport does the household mostly use to reach the nearest facility? On foot = 1 Bicycle = 2 Motor cycle = 3 Public transport = 4 Animal transport = 5 Other = 6
1	Primary School																		
2	Secondary School																		
3	Health post																		
4	Clinic																		
5	Health Centre																		
6	Hospital																		
7	Prenatal / postnatal care																		
8	Telecommunication																		
9	Postal Service																		
10	Public transport																		
11	Milling Service																		

12	Drinking water (dry season)																			
13	Drinking water (rainy season)																			
14	Food market																			
15	All weather road																			
16	Dry weather road																			
17	Agricultural extension service																			
18	Veterinary service																			
19	Fertilizer provider																			
20	Improved seed provider																			
21	Pest/Herb/Insecticides provider																			
22	Police Station																			
23	Primary court																			
24	Microfinance																			
25	Source of firewood																			
26	Cooperative office																			

Form 7

Section 8 Asset ownership of Land, Dwelling, Building and Others

89	90	91	92	93	94
Ser. No.	Does this household exist 12 months ago? Yes = 1 No = 2	Does any member of the household (including the head of the household) own dwelling or other building? Yes = 1 If No = 2, skip to column 93	How many dwelling or other buildings are owned in all?	Does any member of the household (including the head of the household) own any land holding? Yes = 1 No = 2	If code 1 in column 93, what is the total area in hectare?
1	[redacted]	Now	Now	Now	Now
2	[redacted]	12 months ago	12 month ago	12 months ago	12 mon ago
3	[redacted]	5 years ago	5 years ago	5 years ago	5 years ago

Form 7

… Section 8 Asset ownership of Land, Dwelling, Building and Others

95	96	97	98	99
Ser. No.	If code 1 in column 93, how does the size of land compare to the amount 12 months or 5 years ago? Less now = 1 Same now = 2 More now = 3 Do not know= 4	How does the household use land it does not own? Do not use = 1 Rented = 2 Share cropped = 3 Rent free = 4 Others = 5	If code 2, 3 and 4 in column 97	
			How does the size of land that is not owned by the household compare with the amount 12 months or 5 months ago? Less now = 1 Same now = 2 More now = 3 Do not know = 4	What is the total land area in hectare?
1	[redacted]	Now	Now	Now
2		12 months ago	[redacted]	
3		5 years ago		

Form 7

… Section 8 Asset ownership (Household asset)

100	101	102	103	104
Ser No.	Household Assets	Does the household currently own …? Yes = 1 If No = 2, go to column 104 Not applicable = 3	If code 1 in column 102, how many does the household own?	How does the amount currently owned compare with 12 months ago? More now = 1 Same now = 2 Less now = 3 Not applicable = 4
1	Cattle			
2	Ploughing animals /oxen/			
3	Pack-animals			
4	Equine animals			
5	Sheep and goats			
6	Poultry /Chicken			
7	“Newit & Aruet”			
8	Sickle			
9	Axe			
10	Pick axe			
11	Plough			
12	Stoves /Gas, Electric/			
13	Blanket /”Gabi”/			
14	Mattresses &/or beds			
15	Watches or clocks			
16	Iron /Electric or charcoal/			
17	Telephone			
18	Radio			
19	Television			
20	Video deck			
21	Sofa set			
22	Table and chair			
23	Bicycle			
24	Cart			
25	Sewing machine			
26	Loom			
27	Refrigerator			
29	Jewel /Gold, silver/			
29	Car /Private or commercial/			

Form 8

Section 9 Indicators of household living conditions

105	106	107	108	109	110	111	112	113	114	115
Ser No.	Has this household suffered food shortage during the last 12 months? Yes = 1 No = 2	If Yes in column 106 For how many months has this household suffered food shortage during the last 12 months? (If less than one month enter "0")	How is this household's current living standard with respect to food when compared with 12 months ago?	How is this household's current living standard with respect to clothing when compared with 12 months ago?	How is the over all living standard of the household when compared with 12 months ago?	How is the living standard of the community when compared with 12 months ago?	For how many months do you think your current year crop production lasts in subsisting the household?	Is the household capable to raise 100 Birr with in a week time in case of any emergency need? Yes = 1 No = 2	If yes in column 113 How would the household obtain the 100 Birr?	If yes in column 106 What measure was taken by the house hold? Safety net = 1 Food Aid =2 Buying =3 Other = 4
1										

Code for column 108 – 111: Much worse now = 1
Worse now = 2
Same = 3
A little better now = 4
Much better now = 5

Code for column 114: Sale of animals and their products = 1
Sale of crops = 2
Sale of forest products = 3
Own cash = 4
Withdrawal from Bank/Saving = 5
"Equb" = 6
" Edir" = 7
Loan from Bank or other institutions = 8
Loan from relatives = 9
Gift from relatives = 10
Loan from non-relatives = 11
Gift from non-relatives = 12
Sale of household assets = 13
Sale of personal items (Gold, etc.) = 14
Others, Specify = 15

… Section 9 Indicators of household living conditions

116	117		118						119	
What is the main source of income of the household? (In cash or in kind)	Major shocks during the last 12 months Yes = 1 No = 2		**If code 1 in column 117** How did the household cope with the shock? Yes = 1 No = 2 Food Aid	Sale of livestock and livestock products	Sale of other agricultural	Sale of household assets	From own cash	Other (Specify	How many times does this household experienced the major shocks over the last 5 years? (Ask for each of the specified Major shocks in column 117)	
	Death of household member									
	Illness of household member									
	Loss of job of HH member									
	Food shortage									
	Drought									
	Flood									
	Crop damage									
	Loss/death of livestock									
	Price shock									
	Other (Specify)									

Code for column 116: From own agricultural enterprise = 1
From household enterprise other than agriculture = 2
Gift and remittance received from Gov. Organization = 3
Gift and remittance received from NGOs = 4
Gift and remittance received from households/individuals = 5
Gift and remittance received from abroad = 6
Collected free (wood, water,… etc) = 7
Wages, salaries, bonuses, overtime, and allowances = 8
Pension and other social security benefits = 9
From saving (Bank and other saving account) = 10
Interests and royalties received = 11
Dividends = 12
Income from house rent = 13
Income from rent other than house rent = 14
From sale of household fixed assets = 15
From sale of personal care fixed asset goods = 16
Other current transfers = 17

Form 9

Section 10 HIV/AIDS (All Households)

120	121	122			123	124								125			126
Ser No.	Do you know the existence of HIV/AIDS? Yes = 1 If No = 2, End of Questions!	**If Yes in column 121** Do you know HIV/AIDS Transmission ways? Yes = 1 No = 2			Did you realize any person (sick/dead) of HIV/AIDS in your village during the last twelve months? Yes = 1 No = 2 I do not know = 3 Not willing to answer = 4	**If 'Yes' in column 123** Would you please specify the number of persons whom you think were Sick/Dead of HIV/AIDS in your village during the last 12 months?								Which HIV/AIDS protection methods do you know? Yes = 1 No = 2 Not willing to answer = 3			If Yes in column 125 Have you ever used any of the protection methods in the last twelve months? Yes = 1 No = 2 Not willing to answer = 3
		Sexual Intercourse	Blood	Mother to child		Age	Sick				Dead						
							Male		Female		Male		Female		Being Faithful	Absteinance	Using condom	
1						Below age 15												
2						15 - 64												
3						65 and above												

Form 10

Section – 11 Member Participation, Extravagancy and Addiction (For HH members 18 years and over).

127	128	129	130	131	132	133	134	135
						Extravagancy and addiction		
Serial Number (transfer from form 1)	List of Household members aged 18 years and over (transfer from form 1)	Are you member of ---- M/P/ cooperative? Yes = 1 No = 2, skip to 133	What kind of services do you get from ----- M/P/ Cooperative?	In what activities do you participate in ------ M/P/Cooperative?	Do you believe that being member of cooperative has assisted you in economic growth? Yes = 1 No = 2	Do you spend your money on unnecessary or luxurious goods? Yes = 1 No = 2	Do you have any type of addiction you spend money on? Yes = 1 No = 2	Type of addiction? Alcohol = 1 Drugs = 2 Others, Specify= =3

Column 130: 1= Sale of agricultural products to the cooperative
2= Buy goods from the Cooperative
3 = Get training on Extension and other skill development activities
4 = I am Employed in the cooperative
5 = At least two of the above
6 = Others, Specify

Column 131: 1 = During quarter and annual meetings only
2 = During general assembly meetings only
3 = During Elections only
4 = When I do have time only
5 = I do not participate at all
6 = Others, Specify

Form 11

Section – 12 Democracy, Good governance and Human rights and adult weight (For HH members 5 years & over)

136	137	138	139	140	141	142	143	144	145					
Serial Number (transfer from form 1)	List of Household members aged 5 years and over (transfer from form 1)	Are you member of ---- M/P/ cooperative? Yes = 1 No = 2, skip to 144	Do you have any idea about civic education? Yes = 1 No = 2	Are schools giving civic education to students in your Woreda? Yes = 1 No = 2	Do you participate in Tabia, Woreda, Zonal, Kilil, or Federal elections? Yes = 1 No = 2	Do you have access to legal systems if needed? Yes = 1 No = 2	Is there any case you dropped because of inability to afford? Yes = 1 No =2	Adult Height and Weight						
								Height in cm.	Weight in Grams					

Form 12

Section – 13 Consumption and Expenditure

1. Consumption of food items in a household for the last 12 months.

Ser No.	Food Items	Consumption by household			
		Unit	Quantity	Value in Birr	Remark
1	**2**	**3**	**4**	**5**	**6**
1	Sorghum	Kg			
2	Rice	Kg			
3	Maize	Kg			
4	Wheat	Kg			
5	Milk	Liter			
6	Meat	Kg			
7	Sugar	Kg			
8	Salt	Kg			
9	Oil	Liter			
10	Others, Specify				

2. Amount of Expenditures for a household on various food and non-food items for the last 12 months.

Ser No.	Items	Annual Expenditure in Birr	Remark
7	**8**	**9**	**10**
1	Clothing		
2	Medical /Health Care/		
3	School Fee		
4	Religious Contributions		
5	Purchase of Animals		
6	Kerosene /Lamp Fuel/		
7	Veterinary Services		
8	Social Obligations /Marriage, etc/		
9	House Utensils		
10	Transport cost		
11	Alcohol and tobacco		
12	Others, Specify		

Thank You !!